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UNIVERSITY OF VIRGINIA
THE COLGATE DARDEN GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
Tayloe Murphy Institute

Virginia Issues: Indexing The Individual Income Tax

John L. Knapp and Philip J. Grossman

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John L. Knapp and Philip J. Grossman

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FOREWORD

The basic features of the Virginia individual income tax--the largest source of state tax revenue--have remained virtually unchanged since 1972. This means that dollar magnitudes included in the structure have not been adjusted for the rapid inflation that has plagued the economy. The result has been what some observers have referred to as an unlegislated increase in taxes. That is, as incomes increase reflecting inflation, individuals are subject to higher tax rates, even though their real incomes have not necessarily changed, and this occurs without legislative action to increase tax rates.

Indexing is a method for automatically adjusting an income tax structure for inflation. Nine states have adopted indexing and, starting in 1985, the federal income tax will be indexed. This issue paper explains indexing, reviews existing programs, considers the pro and con arguments, and reports on proposals for Virginia.

Indexing the Individual Income Tax is the fourth in the Tayloe Murphy Institute issue series. Earlier topics included the local real property tax, state aid to localities, and local tax sharing. The purpose of the issue series is to stimulate debate on topics of current interest in Virginia.

John L. Knapp, research director of the Economic Studies Center at the Tayloe Murphy Institute, and Philip J. Grossman, a research assistant at TMI, authored this study. As their list of acknowledgments makes clear, they had the benefit of comments and assistance from many persons.

Charles O. Meiburg, Director
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Charlottesville, Virginia
November 1981

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The authors would like to express their appreciation to Robert T. Benton and Nancy D. Beistel of the Virginia Department of Taxation and John A. Garka of the Virginia Division of Legislative Services who provided valuable technical advice.

This study contains the results of the authors' 1980 mail survey of states with indexing. The survey was also the basis for an article which appeared in the Spring 1981 issue of State Government. The questionnaire was sent to selected state department heads, research association staffs, and legislators who administer the tax or who had an important role in the bill's history. The authors wish to acknowledge the cooperation of the many respondents.

The authors would also like to thank Virginia General Assembly members Archibald C. Campbell, Richard C. Cranwell, George W. Jones, and Warren G. Stambaugh, who were kind enough to respond to a survey on legislative attitudes.

No TMI publication would be possible without our highly competent support staff. Amanda H. Shull did all of the typing and assisted with many details of publication. Barry A. Jackson designed the cover and performed the other graphics. John A. Alexander, Ann O'Leary Grossman, and Bruce K. Johnson edited the manuscript. David C. Hodge proofread the work.

The authors take full responsibility for all conclusions and for any errors that remain despite our best efforts to avoid them.

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CHAPTER 1
WHY INDEX?

The last major revision of the Virginia personal income tax structure occurred in 1972. The average effective tax rate at that time stood at 2.30 percent.1/ By 1979, the effective tax rate had risen by 0.68 percentage points to 2.98 percent, an increase of nearly one-third. The major cause of this rising tax burden is that the fixed dollar features of the tax system have been distorted by rapid inflation. Inflation reduces the real value of exemptions and deductions and lowers the real bracket boundaries, subjecting both a greater portion of real income to the tax and a greater portion of taxable income to the highest marginal tax rate. Inflation also distorts income from capital gains and business enterprise. The result has been automatic, unlegislated tax increases.

The fact that the effective tax rate has been increasing steadily over the past years poses no problems unless taxes are increasing faster than the public wishes. Some may argue that the inflation-induced growth in government is not a misallocation of resources between the public and private sectors. Instead, greater government spending may improve the state's allocation of resources. Perhaps, in the face of a growing population and continued urbanization, the state's demand for public services has been growing faster than the government's ability to raise revenue without a tax increase. If such is the case, an increasing tax burden may be acceptable to finance more government services. The unlegislated tax increases generated by inflation may then provide the desired tax increases automatically, avoiding the cumbersome legislative process.

If, on the other hand, the public believes that state government is not providing adequate services to justify this greater tax burden, or that the government currently commands sufficient revenues to provide all desired services, then taxes may be growing faster than the public wants. In this case, the increasing tax burden caused by inflation does pose a problem.

1/ Average effective tax rate = total taxes paid ÷ total adjusted gross income.

Assuming that this "inflation tax" is unacceptable, and given the assumption that inflation will continue, four policies can offset or mitigate its effects: (1) change rules for adopting new taxing or spending legislation; (2) adopt constitutional or statutory limitations on revenue or expenditure growth; (3) make periodic changes in the tax structure and rates; or (4) index the tax system.

Changes in adoption rules.--One method of mitigating the effects of the inflation tax is to alter the decision rules of the legislature. Rather than requiring only simple majority approval to adopt new tax or spending legislation, a two-thirds or three-quarters vote in favor would then be necessary. If the adoption of such legislation were more difficult, the demand for tax revenues would decrease, lessening the need for a growing tax burden, and possibly permitting a reduction in tax liability. The Delaware legislature, for example, has adopted a three-fifths vote requirement for legislation designed to increase any tax or license fee. In Virginia, a majority of all elected members of each house is necessary to adopt taxing or spending legislation.1/

Revenue or expenditure limitations.--Some states have attempted to control the rise in the public's tax burden by placing constitutional or statutory limitations on the growth of government. Proposals for limiting either the share of total income accounted for by taxes or the growth in expenditures have been suggested. In Virginia, a constitutional amendment has been proposed which would limit the rate of growth of appropriations from tax revenues in each biennium to the estimated rate of growth of the Virginia economy during the same biennium. The amendment was passed by both houses during the 1981 legislative session. To become part of the Virginia Constitution, the amendment will have to pass in the 1982 session and win a majority in a referendum. As of 1979, thirteen states had adopted some form of limitations on the growth of government (see Appendix Table A.1). All but two of those states--Colorado and Oregon--have made the limitations permanent. Six of the states limit spending, five restrict government appropriations, one constrains the growth in tax revenue, and one controls the state budget.

Periodic changes.--Periodic cuts in taxes can be made whenever inflation's effects warrant. This is the procedure which has been followed by the federal government. Proponents of periodic tax cuts argue that frequent changes in the tax system by the federal government have kept taxpayers roughly even with inflation while still affording the government the flexibility to target tax cuts where it is believed they are most needed. Opponents of this method assert that frequently there are extended delays before relief is offered and that many income classes have not received tax reductions. From 1965 to 1978, major legislation to reduce federal personal income taxes was enacted in 1969, 1971, 1975, 1976, 1977, and 1978. Nevertheless, between 1965 and 1978, the percentage of income absorbed by individual income taxes rose from approximately 9 percent to just short of 12 percent. Only the two lowest income groups, representing

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1/ Constitution of Virginia, Article IV, Section 11.

40 percent of all tax returns filed, experienced a reduction in the percentage of their income taken for taxes.[1] The bulk of the tax reductions were the result of increases in the standard deductions and credits which tend to benefit mainly the lower income groups. The marginal tax rate fell for the lowest fifth income group while the highest fifth saw its marginal tax rate rise from 23.7 percent in 1965 to 33.6 percent in 1977.[2]

The Reagan tax cut, the first phase of which took effect in October 1981, follows the tradition of periodic changes to compensate for past inflation. The bill also provides for future reductions to offset anticipated inflation until 1985, when indexing goes into effect. In addition to adjusting for inflation, the new law made many structural changes which result in significant reductions in real tax burdens for higher income taxpayers.

In contrast to the many changes in the federal income tax, no significant changes in the Virginia personal income tax have been made since 1972. Although the state conformed much of its tax structure to federal standards in 1972, conformity was later frozen so that subsequent federal increases in exemptions and the maximum standard deduction were not incorporated in the Virginia tax structure.

Indexing.--Indexation, a method of offsetting the effects of the inflation tax, is currently gaining popularity. Indexation involves automatic yearly adjustments to the tax structure to compensate for inflation during a previous twelve-month period. The structure is adjusted by the relevant inflation rate. Increases in income representing only nominal gains to offset rising costs of living do not result in greater real taxes. Indexing provides that real taxes only increase with increases in real income.

1/ Carl J. Palash, "Recent Trends in the Federal Taxation of Individual Income," Federal Reserve Bank of New York Quarterly Review 5 (Autumn 1980), pp. 15-20.

2/ Ibid.

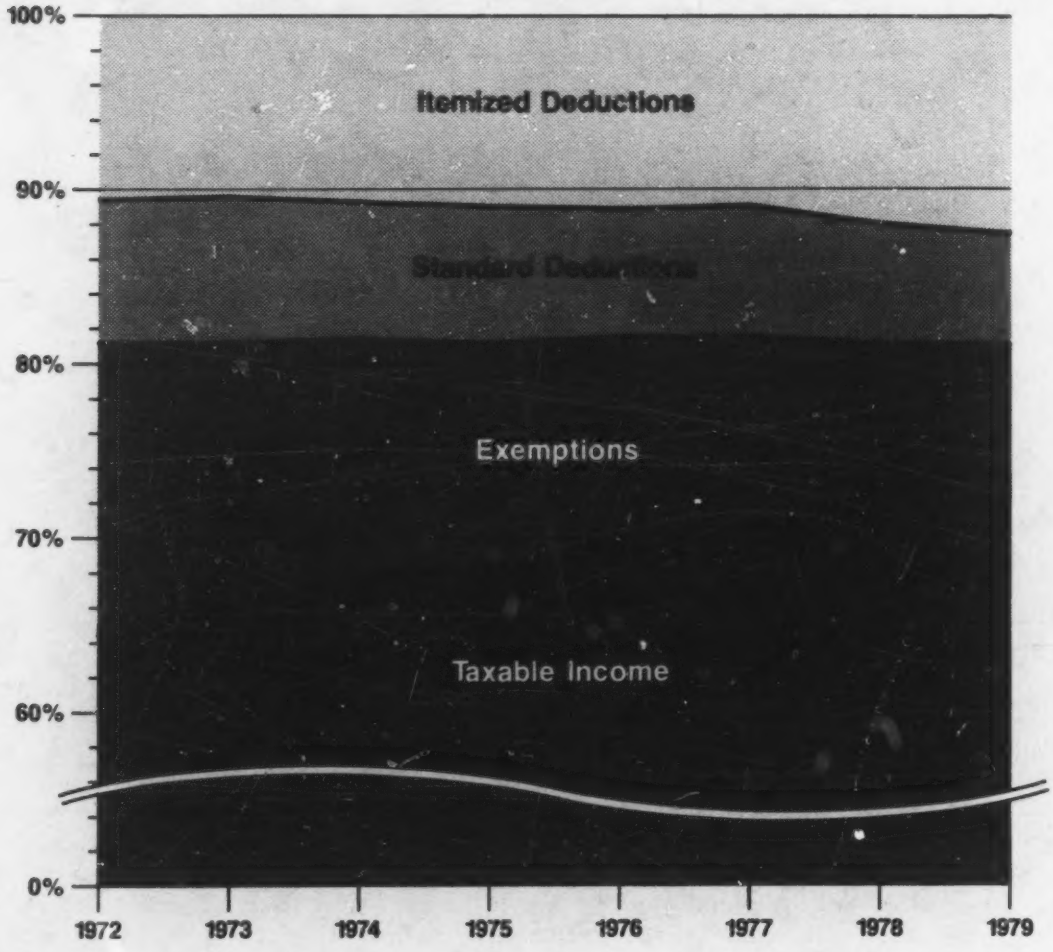
CHAPTER 2
THE IMPACT OF INFLATION ON INCOME TAX BURDENS

Inflation acts in two basic ways to alter tax burdens. First, inflation increases real tax burdens as nominal incomes rise by reducing the real value of the fixed dollar feature of the personal income tax structure. Second, inflation distorts income from capital gains and business enterprise.

Personal income tax.--Inflation affects personal income liability in three ways: (1) it erodes the real value of personal exemptions and of the maximum standard deduction; (2) it shifts a greater percentage of income into higher marginal tax brackets; and (3) it erodes the progressive structure of the tax system. By reducing the real value of exemptions and of the deduction, inflation exposes a greater percentage of income to the income tax. A Virginia family of four with $10,000 in real adjusted gross income and taking the standard deduction would see the percentage of its income protected from taxes by exemptions and the deduction decline from 39.0 percent in year one to 18.7 percent in year ten, if inflation equaled 10 percent in each year. For Virginia taxpayers as a whole, the total value of personal exemptions and standard deductions claimed declined from 24.3 percent of total adjusted gross income in 1972 to 15.0 percent in 1979, a decline of more than one-third (see Figure 2.1).1/

1/ In view of the declining real value of the Virginia standard deduction, it may appear surprising that there was an increase in the proportion of taxpayers using this option. (The proportion increased from 58.4 percent in 1972 to 67.6 percent in 1979.) A taxpayer's decision to claim the standard deduction is usually determined by federal tax provisions and the Virginia requirement that a taxpayer must claim the standard deduction on his state return if he uses it on his federal return. Federal provisions usually dictate the taxpayer's choice because federal tax liability is much greater than state liability. Between 1972 and 1978, the percentage of Virginians claiming the standard deduction on their federal returns increased slightly. During that time, the maximum standard deduction was increased by 60 percent, more than enough to offset the 55.9 percent increase in the Consumer Price Index (CPI). Internal Revenue Service, Statistics of Income, Individual Income Tax Returns (Washington, D.C.: U.S. Government Printing Office, selected issues).

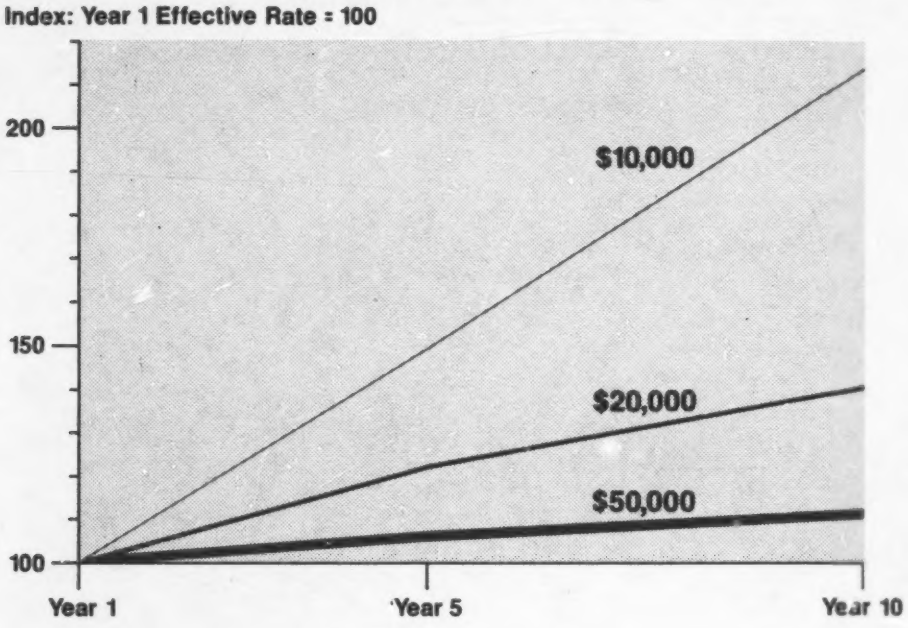
FIGURE 2.1
DEDUCTIONS AND EXEMPTIONS AS A PERCENTAGE OF VIRGINIA ADJUSTED GROSS INCOME, 1972-79



Source: Unpublished data from the Virginia Department of Taxation.

While all households are affected by inflation's erosion of the real value of exemptions and the standard deduction, the burden is greatest for low-income and large households. For low-income households, the standard deduction and exemptions constitute a larger portion of total income than for higher income households. For households that itemize deductions, however, the effects of inflation are mitigated by the rising value of deductible expenses. Figure 2.2 portrays the effects of inflation on the ratio of effective tax rates for three hypothetical four-member households with different incomes. In each case, real income remains constant over the ten-year period; nominal income grows at exactly the rate of inflation, 10 percent; and the standard deduction is taken. For the $10,000 income household, the effective tax rate more than doubles over the ten-year period. For the $20,000 and $50,000 income households, the increase is only 40 percent and 12 percent, respectively.

FIGURE 2.2
EFFECTIVE TAX RATE INDEXES FOR THREE REPRESENTATIVE FOUR-PERSON HOUSEHOLDS[a/]



a/ Assumes constant real income and annual inflation of 10 percent.

For large households, exemptions constitute a greater portion of total income. Table 2.1 contains examples of the effects of inflation on taxes paid for four hypothetical household sizes in two real income classes. Again, in each case, the standard deduction is taken and real income remains constant while nominal income grows at exactly the rate of inflation, 10 percent. For a single-person household with real income of $10,000, the percentage increase in tax liability is only slightly more than half the percentage increase for a six-person household. At the $20,000 income level, the difference is less dramatic, but there is still a steady increase in the percentage change in tax liability as household size increases.

Inflation also increases a household's tax burden by subjecting a greater portion of its income to the highest applicable marginal tax rate and by pushing the household into higher tax brackets. Table 2.2 illustrates an example of inflation's effect when the household's marginal tax bracket does not change. For a $10,000 real income household of four taking the standard deduction, income is taxed at the 5 percent marginal tax rate. If nominal income grows at the same rate as inflation (10 percent), in year five, the household's income is still taxed at the 5 percent marginal tax rate, but the effective tax rate has increased 0.86 percentage points. The effective tax rate increases because the portion of income taxed at the highest applicable rate increases as income grows

TABLE 2.1
AN EXAMPLE OF HOW THE VIRGINIA INCOME TAX AFFECTS HOUSEHOLDS OF DIFFERENT SIZE AND INCOME, ASSUMING 10 PERCENT INFLATION

Real Income Level and Number of Persons in Household	Taxes Paid			
	Year 1	Year 5	Year 10	Percentage Change, Year 1 to Year 10
$10,000				
1	$265	$472	$986	372.1
2	235	442	952	405.1
4	175	382	883	504.6
6	117	322	814	695.7
$20,000				
1	$781	$1,314	$2,342	299.9
2	746	1,280	2,308	309.4
4	677	1,211	2,239	330.7
6	608	1,142	2,180	356.9

TABLE 2.2
AN EXAMPLE OF HOW THE VIRGINIA INCOME TAX EXPOSES MORE INCOME TO HIGHER TAX RATES, ASSUMING 10 PERCENT INFLATION

	Year One	Year Five
Adjusted gross income (constant real income)	$10,000	$14,641
Less: Exemption	2,400	2,400
Deduction	1,500	2,000
Taxable Income	6,100	10,241
Tax:		
at 2%	60	60
at 3%	60	60
at 5%	55	262
Total tax	175	382
Effective tax rate	1.75%	2.61%
Percentage point increase in tax rate between years		0.86

with inflation. In year one, only 11.0 percent of total income is taxable at the 5 percent rate, but in year five, the percentage of income taxable at 5 percent is 35.8 percent.1/

1/ A portion of the increase in the effective tax rate is attributable to the exemption/deduction effect.

Table 2.3 provides an example of inflation's effect on a household's tax burden as it pushes the household into a higher marginal tax bracket. For a four-person household with constant real income of $5,000 taking the standard deduction, income in year one is taxed at the first bracket rate only, and the effective tax rate is 0.5 percent. By year five, inflation has pushed the household into the second marginal tax bracket. The effective tax rate has increased 0.6 percentage points to 1.1 percent. For Virginia taxpayers as a whole, income taxable at the lowest marginal rate, 2 percent, has declined from 40.7 percent of total taxable income in 1972 to 26.6 percent in 1979, a decline of over one-third. During the same period, income taxable at the highest marginal rate, 5.75 percent, nearly doubled, from 14.7 percent to 27.5 percent of total taxable income (see Figure 2.3).

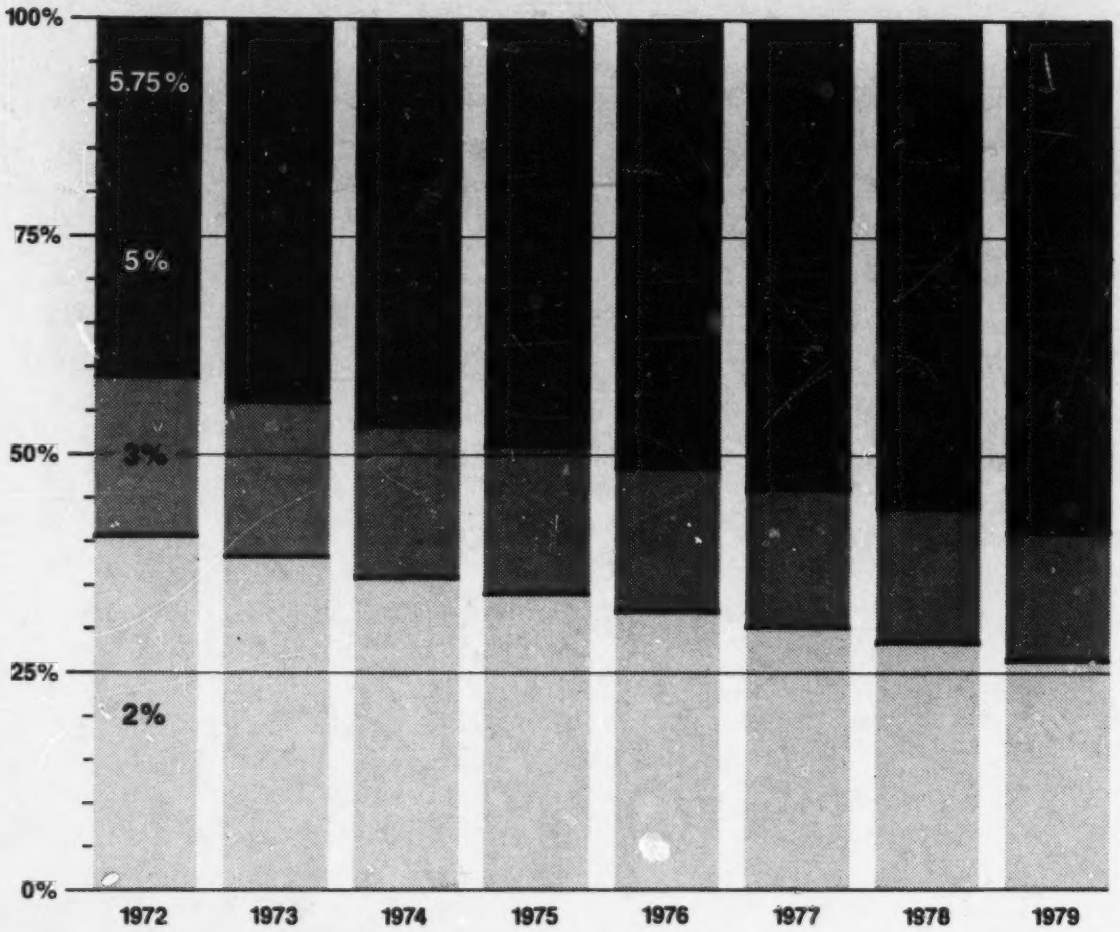
TABLE 2.3
AN EXAMPLE OF HOW THE VIRGINIA INCOME TAX CAN PUSH INCOME INTO A HIGHER MARGINAL TAX BRACKET, ASSUMING 10 PERCENT INFLATION

	Year One	Year Five
Adjusted gross income (constant real income)	$ 5,000	$ 7,321
Less:		
Exemption	2,400	2,400
Deduction	1,300	1,300
Taxable Income	1,300	3,621
Tax:		
at 2%	26	60
at 3%		19
Total tax	26	79
Effective tax rate	0.5%	1.1%
Percentage point increase in tax rate between years		0.6

Overall, inflation alters the legislated distribution of the tax burden. To illustrate this point, we show two hypothetical taxpayers in Table 2.4, each representing a four-person household taking the standard deduction. Taxpayer A has an income of $10,000 in 1972, and taxpayer B has an income of $16,000. We then assume their current dollar incomes increase at the rate of change in the U.S. Consumer Price Index (CPI) and compute their tax liability in each year from 1972 to 1980.

Taxpayer A's effective tax rate rises continously from 1.75 percent in 1972 to 3.35 percent in 1980 and taxpayer B's effective tax rate rises continuously from 2.81 percent in 1972 to 4.25 percent in 1980. A rough indicator of progressiveness is the ratio of taxpayer B's effective tax rate to taxpayer A's effective tax rate. If progressiveness remained unchanged, the progressiveness

FIGURE 2.3
PERCENTAGE OF VIRGINIA TAXABLE INCOME TAXED AT EACH RATE, 1972-79



Source: Unpublished data from the Virginia Department of Taxation.

ratio would not change. However, as shown in Table 2.4, the ratio dropped from 1.61 to 1.27, indicating a reduction in progressiveness. Eventually, if rapid inflation continues and no change is made in the tax structure, the Virginia income tax will become a proportional rather than a progressive tax.

Business and Capital Gains Tax.--For business and capital gains taxes, inflation creates problems with the measurement of income, not with the tax structure.

TABLE 2.4
AN EXAMPLE OF HOW THE VIRGINIA INCOME TAX IS BECOMING LESS PROGRESSIVE DUE TO INFLATION

Year	Income[a] Taxpayer A	Income[a] Taxpayer B	% Change in CPI in Preceding Cal. Year	Tax[b] (Effective Rate in Parentheses) Taxpayer A	Tax[b] (Effective Rate in Parentheses) Taxpayer B	Progressiveness Ratio[c]
1972	$10,000	$16,000	...	$175.00 (1.75%)	$450.00 (2.81%)	1.61
1973	10,620	16,992	3.3%	201.35 (1.90)	504.00 (2.97)	1.56
1974	11,788	18,861	6.2	251.00 (2.13)	611.51 (3.24)	1.52
1975	12,861	20,577	11.0	296.60 (2.31)	710.81 (3.45)	1.49
1976	13,607	21,771	9.1	330.35 (2.43)	778.83 (3.58)	1.47
1977	14,491	23,186	5.8	374.55 (2.58)	860.20 (3.71)	1.44
1978	15,607	24,971	6.5	430.35 (2.76)	962.83 (3.86)	1.40
1979	17,371	27,793	7.7	525.83 (3.03)	1,125.10 (4.05)	1.34
1980	19,716	31,545	11.3	660.67 (3.35)	1,340.84 (4.25)	1.27

a/ Income was increased in each year by the rate of growth in the U.S. Consumer Price Index in the preceding year.

b/ The tax was calculated assuming a married couple filing jointly with four exemptions and taking the standard deduction.

c/ Ratio of taxpayer B's effective tax rate to taxpayer A's effective tax rate.

For capital gains, the problem is measuring the real gain realized from the sale of an asset during inflationary times. During a period of inflation, capital asset prices increase along with the prices of other goods. Capital gains income is currently defined as the difference between an asset's sale price and its original purchase price. Inflationary increases in capital asset prices widen this difference. Taxes are levied on this nominal increase in value. Thus, there may be a tax liability even though the real value may have stayed constant or even decreased.

As an example, assume an asset is purchased in year one for $10,000 and sold in year ten for $20,000. Capital gains of $10,000 would be subject to tax. At an annual rate of inflation of 10 percent, however, the year one purchase price in year ten dollars would be $23,581. Rather than having a capital gain of $10,000 in year ten, the owner would sustain a real capital loss of $3,581. Taxing the $10,000 nominal gain would increase the real loss to the taxpayer by the amount of the tax.

Estimates of the excess tax paid due to the distorted measurement of capital gains are scarce. Feldstein and Slemrod estimate that, in 1973, individuals paid approximately $500 million in extra federal taxes on corporate stock sales because of inflation's distorting effect on capital gains income. Taxes were paid on $4.5 billion in capital gains, which, when adjusted to reflect real gains, became a real capital loss of nearly $1 billion.1/

No study has been made of the extra cost to Virginia taxpayers caused by the effects of inflation on capital gains. Nonetheless, some perspective on the problem is provided by federal income tax data showing the amount of net capital gain reported on 1978 returns filed by Virginia residents. Since the Virginia and federal tax bases are fairly comparable, the federal data can be used. The net gain reported after exclusions was $378 million.2/ If we arbitrarily assume that the maximum marginal tax rate of 5.75 percent was applied, the tax yield to the state would have been $22 million. This represents 2.6 percent of total tax revenue collected that year. Since indexing's cost would only be a percentage of this, it would be a relatively insignificant expense if capital gains should be indexed for inflation.

1/ Martin Feldstein, and Joel Slemrod, "Inflation and the Excess Taxation of Capital Gains on Corporate Stock," National Bureau of Economic Research Working Paper No. 234 (Cambridge, Massachusetts: National Bureau of Economic Research, Inc., February 1978).

2/ U.S. Department of the Treasury, Internal Revenue Service, 1978 Statistics of Income, Individual Income Tax Returns, Publication 79 (3-81) (Washington, D.C.: U.S. Government Printing Office, 1981), p. 131.

Inflation also distorts the measurement of income from business activities. The depreciation that a business is allowed to deduct from gross income in the determination of taxable profits is based on the historical cost of the asset. Depreciation is supposed to represent the cost of that part of the capital good "used up" during the course of the year, and is thus deductible as part of the firm's production cost. As inflation pushes up the prices of capital goods, the historical cost of capital goods owned by a firm diverges from the "true" or replacement cost of the goods in current dollars. Depreciation based on historical cost does not, then, reflect the true cost of the capital used. The firm's gross income will rise as it increases its prices to keep up with inflation. Expenses, in general, will also rise with inflation. But, since depreciation is based on historical costs, it will not increase with the price level. Gross income will therefore increase faster than expenses and taxable profits will be distorted upwards.

Businesses that employ the FIFO (first-in, first-out) inventory valuation method treat the inflation-induced change in the price of inventory items between the time of their purchase and sale or use as a realized gain and as a component of taxable profits. Inventory valuation, like depreciation, is based on historical costs and as such does not increase with the price level; therefore, it also overstates taxable profits. As a result of this problem, many firms have switched to the LIFO (last-in, first-out) inventory valuation method which values inventories in current dollars.

Estimates of the excess tax paid in Virginia due to inflation's distortion of business income are not available.

CHAPTER 3
HOW INDEXING WORKS

Indexing is the adjustment of the tax structure to offset, either partially or completely, the effect of inflation on individuals' tax liabilities. Not all taxes require indexing in order to neutralize inflation's impact on tax burdens. The state sales tax is an example of a tax unaffected by inflation. If taxable sales should increase by 10 percent, regardless of whether it is an inflation-induced increase or not, state sales tax revenue will likewise increase by 10 percent. Taxes paid remain a constant proportion of the tax base. Conversely, the state gasoline tax provides an example of a tax that is severely affected by inflation. Since the tax is based on a volume measure (11 cents per gallon), revenues respond only to volume. If the tax rate remains the same and gasoline prices double, the effective tax rate is halved. On the other hand, the personal income tax and the business income tax are expanded by inflation. The progressive rate structure and/or the fixed dollar or historical cost features of these taxes lead to rising real taxes on constant real tax bases. Real tax burdens rise in response to inflation.

Alternative Methods of Indexing

There are a number of alternative approaches to indexing the personal income tax. Each method will maintain approximately constant effective tax rates in the face of rising nominal income.

Adjusting Income for Inflation.--This method would deflate current dollar income so as to eliminate that portion arising solely from inflation. As an example, suppose year one income was $10,000, year two income was $12,000, and the inflation rate was 10 percent. Year two income would be deflated by the rate of inflation to remove that portion which represents only the nominal increase. This method reveals real income in year two to be $10,909. The tax liability on real income of $10,909 could now be computed from the existing tax schedule.

Reduction of Marginal Rates.--The effects of inflation can be offset by deflating the marginal tax rates which apply to the brackets with fixed dollar limits. To illustrate this method, if inflation for the year was 10 percent, the Virginia income tax schedule would change as shown:

Brackets	Unadjusted Tax Rate	Adjusted Tax Rate
$ 0- $3,000	2.0%	1.8%
$3,001- $5,000	3.0	2.7
$5,001-$12,000	5.0	4.5
Over $12,000	5.75	5.2

Direct Indexing of Fixed Dollar Features.--The method most commonly considered, direct indexing of fixed dollar features, and the only one adopted by those states with indexing legislation, involves inflating the fixed dollar values of the tax structure by changes in the price level. This method inflates the fixed dollar values to maintain constant real values, preventing the taxpayer from being pushed into higher marginal tax brackets without real increases in income.

This paper will examine direct indexing of fixed dollar features since it is the most widely considered and the only type of indexing adopted.

Indexing and the Personal Income Tax

The personal income tax is the only tax for which indexation has been adopted in the United States. Since 1978, nine states have enacted indexing legislation and an additional seven states, including Virginia, have considered similar proposals. Under the new Reagan tax law, the federal government will adopt indexing in 1985.

The personal income tax system contains a number of fixed dollar variables that can be distorted by inflation. The three major features, and the ones most commonly addressed in indexing legislation, are the marginal tax bracket boundaries, the standard deduction, and the personal exemptions or credits. Other features of the Virginia tax code that are fixed in dollar terms include the child and dependent care deduction, the $150 limit on the medical insurance premiums deduction, and the $100 minimum on the casualty or theft loss deduction.1/

While indexing of most fixed dollar features leads to a smaller tax liability than occurs without indexing, this is not so for all features. The $100 minimum on the casualty or theft loss deduction provides one example. Assume an asset is purchased in year one for $200 and that the inflation rate for each year is 10 percent. If this asset were lost to fire in year five, the taxpayer could claim a deduction of $100. If the fixed $100 minimum had been indexed for

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1/ The Virginia personal income tax conforms in many respects to the federal tax; most permissible deductions at the federal level are allowed at the state level.

inflation, the deduction would have been only $54, the $200 value less the inflated minimum of $146. If income were taxable at the maximum rate, 5.75 percent, the increase in taxes would have been $2.60.[1/]

Indexing of the personal income tax (major features only) involves adjusting the three fixed dollar features--the bracket boundaries, the standard deduction, and the personal exemptions--for changes in the price index, thereby maintaining their real value. Due to administrative problems, adjustments are typically made for price index changes lagged from one-half to one full year. For example, with a one-year lag, the 1981 tax structure would not be indexed for inflation occurring during 1981, but instead, for inflation that occurred in 1980.

Table 3.1 indicates the cumulative change in the tax structure through 1981 that would have occurred if indexation had been in force since 1972. The changes assume a one-year lag in adjustment for CPI changes. As shown, the dollar value of the exemptions, deduction, and bracket boundaries has more than doubled since 1972, reflecting the more than doubling of the CPI. For the year-to-year changes in the income tax structure, see Appendix Table A.2.

Table 3.2 illustrates the effects of indexing on the tax liability for four representative households. The table assumes that real income remains constant (nominal income increases at the same rate as inflation) and that the tax structure is indexed with a one-year lag. Without indexing, the effective tax rate for the single low-income taxpayer more than doubled between 1972 and 1980. But, if the income tax had been indexed, the effective tax rate would have only increased 13 percent. The increase in the effective tax rate, even with constant real income, is due to increasing inflation rates from year to year coupled with the one-year lag in adjustment. If the inflation rate had been declining in each successive year, the effective tax rate would have fallen.

Other taxpayers would experience similar results. The low-income married household would have faced only a 25 percent increase in its effective tax rate with indexing rather than the 146 percent increase that occurred without indexing. For the high-income single and married households, the effects, while not as dramatic, are still significant--a 4 percent increase with indexing versus a 23 percent increase without indexing, and a 6 percent increase with versus a 34 percent without, respectively.

Actual 1980 tax dollar savings due to indexing would have ranged from $62, for the low-income married household, to $375, for the high-income married household.

[1/] It is assumed, for this example, that the asset price is not indexed.

TABLE 3.1
VALUE OF VIRGINIA FIXED DOLLAR FEATURES IN 1981, ASSUMING INDEXING SINCE 1972

	Actual, 1972	Inflation Adjusted, 1981
Exemptions:		
Personal, dependent blind	$ 600	$1,221
65 or over	1,000	2,036
Standard deductions:		
Percentage	15% of AGI	15% of AGI
Maximum:		
Married, joint or single	$2,000	$4,072
Married, separate	1,000	2,036
Minimum:		
Married, joint or single	$1,300	$2,648
Married, separate	650	1,323
Net taxable income brackets:		
Rates: 2%	$ 0- 3,000	$ 0- 6,111
3%	$3,001- 5,000	$ 6,112-10,183
5%	$5,001-12,000	$10,184-24,440
5.75%	Over $12,000	Over $24,440

Source: Table A.2.

TABLE 3.2
EFFECT OF INDEXING FOR FOUR REPRESENTATIVE HOUSEHOLDS

	SINGLE PERSON, LOW-INCOME HOUSEHOLD					SINGLE PERSON, HIGH-INCOME HOUSEHOLD				
		1975		1980			1975		1980	
	1972	Without Indexing	With Indexing	Without Indexing	With Indexing	1972	Without Indexing	With Indexing	Without Indexing	With Indexing
Adjusted gross income	$ 5,000	$ 6,430	$ 6,430	$ 9,857	$ 9,857	$20,000	$25,720	$25,720	$39,428	$39,428
Exemption	600	600	731	600	1,076	600	600	731	600	1,076
Standard deduction	1,300	1,300	1,583	1,479	2,333	2,000	2,000	2,435	2,000	3,588
Taxable Income	3,100	4,530	4,116	7,778	6,448	17,400	23,120	22,554	36,828	34,762
Tax	63	106	87	259	140	781	1,109	1,029	1,898	1,605
Effective tax rate	1.26%	1.65%	1.35%	2.63%	1.42%	3.91%	4.31%	4.00%	4.81%	4.07%

	MARRIED, 4-PERSON, LOW-INCOME HOUSEHOLD					MARRIED, 4-PERSON, HIGH-INCOME HOUSEHOLD				
		1975		1980			1975		1980	
	1972	Without Indexing	With Indexing	Without Indexing	With Indexing	1972	Without Indexing	With Indexing	Without Indexing	With Indexing
Adjusted gross income	$ 5,000	$ 6,430	$ 6,430	$ 9,857	$ 9,857	$20,000	$25,720	$25,720	$39,428	$39,428
Exemption	2,400	2,400	2,924	2,400	4,304	2,400	2,400	2,924	2,400	4,304
Standard deduction	1,300	1,300	1,583	1,479	2,333	2,000	2,000	2,435	2,000	3,588
Taxable Income	1,300	2,730	1,923	5,978	3,220	15,600	21,320	20,361	35,028	31,536
Tax	26	55	38	126	64	677	1,006	903	1,794	1,419
Effective tax rate	0.52%	0.86%	0.59%	1.28%	0.65%	3.39%	3.91%	3.51%	4.55%	3.60%

As can be seen from Table 3.3, indexing would have served to maintain the progressiveness of the tax system. While the progressiveness ratio would have declined even with indexation, the decline would have not been as dramatic as what has occurred without indexing. Without indexing, the progressiveness ratio declined by 1.27 percentage points from 1972 to 1980 for the single person household and by 1.16 percentage points for the married four-person household. With indexing, the declines were 0.23 percentage points and 0.98 percentage points, respectively.

Indexing Capital Gains

Indexing the capital gains tax does not involve adjusting fixed dollar features of the system, but instead, requires adjusting income for inflation. To remove the effects of inflation on the capital asset price, the original purchase price is adjusted by the change in the price index from the date of purchase to the date of sale. This process restates the original purchase price in current year dollars so only real gains in the asset's value are taxed.

Table 3.4 illustrates the effect of indexing on taxable gains. Assume two assets are purchased in year one, for $5,000 each. In year five, both are sold, one for $8,000 and one for $6,000. Assume that, during this five-year period, the price level rose 10 percent per year. Without indexing, $4,000 in capital gains would be subject to tax. But with indexing, the original $5,000 purchase price would be inflated by the change in the price level. The inflated purchase price would be $7,320. Rather than a total of $4,000 in capital gains, a net capital loss of $640 was realized on the sale of the two assets. Under the Virginia tax code, which conforms to the federal code, 40 percent of any capital gain is subject to tax. Without indexing, taxable gains of $1,600 exist and, assuming it is taxable at the highest marginal rate, taxes of $92 are owed. If indexed, there are losses, so no taxes are due, and 50 percent of the capital loss for the year can be taken as a deduction.

Indexing Business Income

As with capital gains, indexing the business income tax involves adjusting measured income for inflation. Business income is distorted by inflation in two ways--business depreciation expense and inventory valuation. Indexing of both will be examined.

Depreciation.--Indexing depreciation requires that the original purchase price be inflated to current dollars. Depreciation expense is then determined using the original depreciation schedule. The inflated depreciation expense measures the cost in current dollars of the asset used up during the year. Taxable profits will be adjusted for the distortions resulting from inflation and the adjusted tax liability can then be determined by applying the usual tax rate.

TABLE 3.3
AN EXAMPLE OF HOW INDEXING PRESERVES THE PROGRESSIVENESS OF THE VIRGINIA INCOME TAX

Year	Single Person Household's Effective Tax Rates			Married 4-Person Household's Effective Tax Rate		
	Low Income	High Income	Progressiveness Ratio[a/]	Low Income	High Income	Progressiveness Ratio[a/]
Unindexed						
1972	1.26%	3.91%	3.10	0.52%	3.39%	6.52
1975	1.65	4.31	2.61	0.86	3.91	4.55
1980	2.63	4.81	1.83	12.8	4.55	3.55
Indexed						
1972	1.26%	3.91%	3.10	0.52%	3.39%	6.52
1975	1.35	4.00	2.96	0.59	3.51	5.95
1980	1.42	4.07	2.87	0.65	3.60	5.54

Source: Table 3.2

a/ Ratio of the high-income household's effective tax rate to the low-income household's effective tax rate.

TABLE 3.4
AN EXAMPLE OF HOW CAPITAL GAINS CAN BE INDEXED

Asset	Purchase Price, Year 1		Sales Price Year 5	Capital Gains	
	Actual	Adjusted		Actual	Adjusted
1	$5,000	$7,320	$8,000	$3,000	$ 680
2	5,000	7,320	6,000	1,000	(1,320)
			Total capital gain (loss)	4,000	(640)
			Less: exclusion (60%)	2,400	0
			Total taxable capital gains (40%)	1,600	0
			Total tax liability (assuming 5.75% rate)	92	0

An example of how depreciation can be indexed is provided in Table 3.5. Assume an asset is purchased in year one for $10,000, it has a useful life of five years, and the annual inflation rate is 10 percent. Based on a straight-line depreciation schedule, the actual depreciation expense each year is simply 20 percent of $10,000, the purchase price in year one dollars. Likewise, the indexed depreciation expense in year one is again just 20 percent of $10,000. To determine the indexed depreciation expense in subsequent years, the purchase price is increased by the inflation index for that year (column 2). Depreciation is then 20 percent of that year's inflated purchase price.

TABLE 3.5
AN EXAMPLE OF HOW BUSINESS DEPRECIATION CAN BE INDEXED

Year	Cumulative Inflation Index	Purchase Price		Depreciation Allowance	
		Actual	Adjusted	Actual	Adjusted[a/]
1	1.00	$10,000	$10,000	$2,000	$2,000
2	1.10	10,000	11,000	2,000	2,200
3	1.21	10,000	12,100	2,000	2,420
4	1.33	10,000	13,310	2,000	2,662
5	1.46	10,000	14,640	2,000	2,928

a/ The accumulated depreciation that would show on the firm's books for the five years is $12,210. The real accumulated value of the yearly depreciation expense is $10,000 in year one dollars and $14,460 in year five dollars, the original purchase price and the replacement cost, respectively.

Inventory.--To index inventory for inflation, the original value of the inventory is adjusted by the price index to current year dollars. The adjusted inventory value represents the real cost to the firm in current dollars of inventory used up in the current year. The usual tax rate can then be applied to the adjusted taxable profits.

Choosing the Index

Any decision to index the tax system must consider the measure of inflation that will serve as the index. The choice of indices available is wide, ranging from those that measure the national experience with inflation to those that measure the inflation rate in a single metropolitan area, and from indices that measure changes in all prices to those that reflect the changes in prices for specific subgroups of goods and services. A number of indices have been discussed widely and adopted by existing indexing legislation. The advantages and disadvantages of several of the more commonly mentioned indices are discussed below.

Consumer Price Index (CPI).--The CPI is the most frequently mentioned and most commonly used index. The advantages of the CPI are many. First, the CPI is a widely recognized index and well publicized in the popular press. Second, national CPI data are released monthly with only a one-month time lag. Third, revisions are infrequent; CPI data are not subject to continual revision as are other possible indices. Finally, the CPI's coverage is broad, both geographically and in the percentage of total population covered. Data are collected in 85 individual geographic areas and 80 percent of the urban population is represented.

The major disadvantage of the CPI is its treatment of home ownership. In calculating the CPI, home ownership is treated as if all owners were purchasing their first house. The major problems with the treatment of housing are: (1) the CPI treats home purchase and mortgage interest payments as separate unrelated transactions, resulting in excessive weighting of housing purchases; (2) it is assumed that all mortgages are of the variable rate type, i.e., mortgages are treated as if they were renegotiated every month; and (3) the CPI uses the actual rather than the real after-tax interest rate. The tax deduction for interest costs makes the true cost of borrowing significantly less.1/

An additional disadvantage of the CPI is that it is based on a fixed market basket of goods. Because both the type of goods and the quantity of each in the market basket are fixed, the CPI does not reflect changes in consumer buying habits as prices change. In times of inflation, consumers will reduce their consumption of items with rapidly increasing prices in favor of items with more moderately increasing prices. The CPI, with its fixed basket of goods, is unable to reflect these changes and so overstates the rate of inflation.

Gross National Product (GNP) Implicit Price Deflator.--The GNP deflator offers most of the same advantages as the CPI and, in addition, suffers from neither the fixed market basket problem nor the housing cost problem. The GNP deflator uses a rent equivalence concept. Rather than using the CPI concept of homeownership cost, this index estimates the rental value of the home and treats that as the monthly cost of home ownership. The GNP deflator is "...a weighted average of the detailed price indexes used in the deflation of GNP. In each period, it uses as weights the composition of constant-dollar output in that period. Changes in the implicit price deflator reflect both changes in the composition of output and changes in prices."2/

The disadvantages of the GNP deflator are three. First, unlike the CPI, the GNP deflator is subject to revision. This can create problems for an indexing program in the method of incorporating the revised index. Second, the GNP deflator's coverage is broader than the CPI's. Many items that do not reflect typical consumer purchases are incorporated. The GNP deflator not only includes consumer purchases, but also such items as business investment goods, government purchases, and foreign trade. Third, the GNP deflator is only available quarterly, an infrequent interval if monthly price movements are desired.

1/ Robert J. Gordon, "The Consumer Price Index: Measuring Inflation and Causing It," The Public Interest 63 (Spring 1981), pp. 112-34.

2/ U.S. Congress, Joint Economic Committee, 1980 Supplement to Economic Indicators (Washington, D.C.: U.S. Government Printing Office, 1980), p. 7.

Personal Consumption Expenditures Index (PCE).--The PCE is a subcategory of the GNP deflator covering only new purchases of goods and services and excluding imports. The PCE offers the same advantages as the GNP deflator without the disadvantage of being too broad a measure of price increases. Furthermore, the PCE uses the rental equivalent method of computing homeownership costs; this method avoids the distortions displayed by the CPI. Unlike the GNP deflator, the PCE is available monthly.

Statewide or Major Metropolitan Price Index.--A fourth alternative is a statewide or major metropolitan area index. The Bureau of Labor Statistics (BLS), publishes consumer price indices bimonthly for a number of major metropolitan areas. A statewide index can be developed independently by a state or, as California did, developed from (BLS) metropolitan indices.

The advantages of a statewide or metropolitan index are similar to those of the CPI. The disadvantage of a statewide index is the cost of developing one independently, since none are reported by the BLS. Furthermore, use of an index for a particular metropolitan area or for several areas carries with it the implicit assumption that price changes are uniform throughout the state. Such an assumption is questionable, as the results of a Tayloe Murphy Institute price survey for eight metropolitan areas in Virginia illustrate.[1/] The most recent survey indicated that, while the average 1979-80 increase for the eight areas was 11 percent, price rises among individual areas ranged from 6 to 13 percent. Obviously, local indices reflect local conditions as well as general pressures on the price level. Moreover, price changes for some nonmetropolitan areas could have fallen outside this range, but they were not measured. Thus, in the absence of a statewide index, a national index may be a better measure of statewide price developments than an index for a particular metropolitan area.

Table 3.6 provides a comparison of inflation rates as measured by five available indices. The CPI generally shows larger percentage changes than the GNP deflator or the PCE. The price change in eight Virginia metropolitan areas from 1975 to 1980 was 58 percent, fairly close to the CPI change of 53 percent. The year-to-year changes in the two series, however, were often quite different. Also the year-to-year variation among the eight areas was large; in several years, the highest rate was double the lowest rate.

Administrative Problems

Indexing the individual income tax does not pose any significant or costly administrative problems. The income tax form is already modified each year and could easily be altered to incorporate new amounts for deductions, exemptions, and bracket boundaries. Indexing would also require annual revisions of the employer tax withholding schedules. Currently, schedules are not revised annually and distribution is limited to new employers. The cost of annually revising and distributing the withholding schedules is estimated by the Virginia Department of Taxation to be relatively minor, from $65,000 to $75,000 yearly.[2/] A similar problem arises in the case of taxpayers who estimate their

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1/ Eleanor G. May, Consumer Price Indicators for Virginia Metropolitan Areas, 1980 (Charlottesville, Virginia: Tayloe Murphy Institute, University of Virginia, December 1980), p. 15.

2/ Virginia Department of Taxation Summary of House Bill 1720.

TABLE 3.6
ANNUAL INFLATION AS MEASURED BY SELECTED INDICES

Year	CPI	GNP Deflator	PCE	TMI Survey, Midyear Average	TMI Survey, Midyear Range
1972	3.3	4.2	3.6	n.a.	n.a.
1973	6.2	5.7	5.7	n.a.	n.a.
1974	11.0	8.7	10.0	n.a.	n.a.
1975	9.1	9.3	7.7	n.a.	n.a.
1976	5.8	5.2	5.1	5	3-7
1977	6.5	5.8	6.0	8	5-10
1978	7.7	7.3	6.9	10	6-12
1979	11.3	8.5	8.9	14	12-18
1980	13.5	9.0	10.2	11	6-13

Source: U.S. Congress, Joint Economic Committee, Economic Indicators (Washington, D.C.: U.S. Government Printing Office), and Eleanor G. May, Consumer Price Indicators for Virginia Metropolitan Areas, 1980 (Charlottesville, Virginia: Tayloe Murphy Institute, University of Virginia, December 1980), p. 15.

n.a. not available

taxes. Estimated tax forms would also have to be revised yearly to adjust for inflation's effects on the fixed dollar features. In both cases, the adjustments for inflation would only take account of the inflation adjustment for the preceding tax year; to have the forms available at the beginning of a taxable year would require less than up-to-date indexing for inflation.

The lag time required for printing also affects the timing of the price index. According to the Department of Taxation, income tax forms must be sent to the printers in June so as to be available in January.[1/] Allowance for printing time lag requires that the inflation index be lagged at least seven months. The most up-to-date index possible would be the ratio of the average of the index for the twelve months ending May 31 of the taxable year, to the average of the index for the twelve months ending May 31 of the immediately preceding taxable year.

Forecasting Problems

Revenue forecasting would be more difficult with indexing than it is now. Under the current system, the Virginia Department of Taxation bases its revenue projections on its forecasts of personal income in current dollars. Indexing would require additional forecasts of inflation and, ideally, the distribution of tax burden by type of taxpayer.

1/ Ibid.

In the 1970's, when prices rose rapidly, the national econometric models did a poor job of forecasting price changes. A major reason for this outcome is attributed to be the erratic monetary policy of the Federal Reserve Board. If the Board succeeds in its announced intention to place more emphasis on stabilizing monetary growth, the rate of inflation should be easier to forecast in the 1980's.

An ideal forecasting technique would incorporate a model of taxpayer income distribution stratified by number of dependents and by type of deduction taken (standard or itemized).[1/] The Virginia Department of Taxation has a sampling program developed by the North Carolina Research Triangle Institute.[2/] The program enables researchers to simulate tax changes with only a fraction of the 2.1 million returns actually filed. If Virginia adopted indexing, the program could be modified to permit simulations based on forecast growth in prices and real income. Even though the results would be in calendar rather than fiscal years, the information would be useful.

Although indexing would make forecasting more difficult, the problem is manageable. Survey results reported on page 32 indicate that states with indexing have not experienced serious forecasting problems.

The Cost of Indexing

Indexing the state income tax will impose significant costs upon the state in the form of reduced tax revenues. More importantly, the cost is not a fixed amount per year, but instead, grows larger with time. This cost and its growing importance as a proportion of the overall state budget is cited as a major objection to indexation.

Historical Studies.--A few historical studies have been undertaken to estimate the impact of indexing on state income tax revenues. The earliest was a 1976 study undertaken by the Advisory Commission on Intergovernmental Relations (ACIR).[3/] ACIR simulated the effects of indexing the Virginia state income tax using a sample of tax returns that statistically represented the income returns filed. Using 1972 as its base year, ACIR estimated the cost of indexing for tax years 1973 and 1974 for both partial and full indexing schemes and with both a one-year lag and no lag in the index. The partial indexing scheme only indexed the exemptions and standard deduction, while the full indexing scheme included the marginal tax bracket boundaries. The index used was the CPI.

In 1973, the cost of indexing with a one-year lag was $4.2 million for partial indexing and $10.7 million for full indexing. In 1974, the costs were

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1/ For an example of this procedure see: Anil K. Puri, "An Analysis of the California Experiment in Partial Income Tax Indexation," National Tax Journal XXXIII, No. 2 (June 1980), pp. 203-8.

2/ For a description of the sampling program see: Barry E. Lipman and Richard D. Brown, Fiscal Prospects and Alternatives: 1976, A Staff Report of the Revenue Resources and Economic Commission (Richmond: Revenue Resources and Economic Commission, June 1975), pp. 151-4.

3/ Advisory Commission on Intergovernmental Relations, Inflation and Federal and State Income Taxes, A-36 (Washington, D.C.: U.S. Government Printing Office, 1976), Appendix A.

$13.0 million and $29.3 million, respectively. With no lag, the costs in 1973 were $7.8 million for partial and $17.7 million for full. In 1974, the figures were $23.7 million and $50.9 million, respectively. As an example of the growing cost of indexing, full indexing with a one-year lag would have reduced state tax revenues by 2.4 percent in 1973 and 5.7 percent in 1974.

The ACIR study was followed in 1977 by a study authored by Robert Benton and Philip Gabel, both of the Virginia Department of Taxation.[1/] Employing the ACIR methodology, they extended the estimates of indexing's cost to tax year 1975. Still using tax year 1972 as the tax base, they estimated indexing's cost under both partial and full indexing schemes, but only with no lag in the index. The estimated cost of continued indexing for 1975 was $38.5 million for partial indexing and $80.1 million for full indexing.

Authors' Estimates.--Using aggregated data, the cost of indexing the state's personal income tax for years 1973 through 1979 has been estimated (see Table 3.7.[2/] The cost was derived assuming a one-year lag in the CPI, full indexing of the three major features, and 1972 as the base year. The foregone revenue would have grown from $15.0 million, 3.4 percent of total actual tax revenue, in 1973, to $194.2 million, 19.4 percent of total actual tax revenue, in 1979.

TABLE 3.7
IMPACT OF INDEXATION ON AGGREGATE PERSONAL INCOME TAXES

Tax Year	Actual Tax Revenues	Indexed Tax Revenues	Cost of Indexing	
			Amount	% Reduction in Revenues
1972	$ 364.5	...	...	...
1973	436.8	$421.8	$ 15.0	-3.4%
1974	510.5	479.8	30.7	-6.0
1975	560.2	497.6	62.6	-11.2
1976	657.8	563.0	94.8	-14.4
1977	748.5	626.0	122.5	-16.4
1978	865.2	712.6	152.6	-17.6
1979	1,001.2	807.0	194.2	-19.4

Between 1972 and 1979, the overall effective tax rate increased from 2.30 percent to 2.98 percent, an increase of 0.68 percentage points increase (see Figure 3.1). With indexing, the increase in the effective tax rate would have

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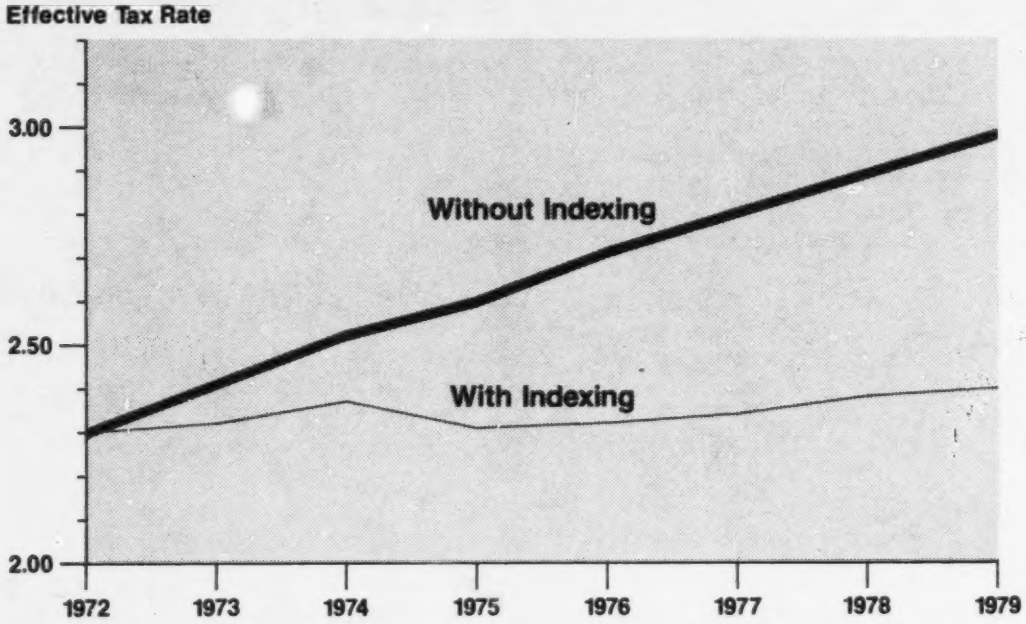
1/ Robert T. Benton and Philip M. Gabel, "Uses of a State Income Tax Sampling Model in Virginia: With Applications to Credits and Indexation," Revenue Administration, Proceedings of the 45th Annual Meeting of the National Association of Tax Administrators (1977) pp. 159-71.

2/ For a discussion of the methodology used in arriving at the estimates, see Appendix C.

FIGURE 3.1
EFFECTIVE TAX RATES, 1972-79



been much less dramatic. Over the seven years, the rate would have increased from 2.30 percent to 2.40 percent, an increase of 0.10 percentage points.

Authors' Projections.--Using fiscal year 1981-82 as the base year, projections of the cost of indexing the personal income tax for fiscal years 1982-83 and 1983-84 were derived.1/ The authors used a base year of 1981-82 because they believed adoption of indexing legislation would not include adjusting the tax structure for inflation since 1972. They assumed a one-year lag in the CPI and full indexation of the three major features were assumed.

To derive the projections, the log of the percentage change in indexed tax revenues (ITR) for 1973 through 1979 was regressed on the log of the percentage change in actual tax revenues (ATR) and the log of the inflation rate, as

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1/ For a discussion of the methodology used in arriving at the projections, see Appendix C.

measured by the percentage change in the CPI lagged one year. The equation, with t statistics in parentheses, is:

$$\text{Log ITR} = 1.19213 \underset{(8.54)}{\text{Log ATR}} - .4357 \underset{(-2.21)}{\text{Log CPI}}.$$

Both coefficients are significant at the 95 percent confidence interval.

Using unpublished data for the two independent variables provided by the Virginia Department of Taxation, projections of the percentage change over the previous year for indexed tax revenues were developed. Table 3.8 provides the forecasted cost of indexing the income tax for the 1982-84 biennium. The total cost of indexing for the budgeting period is approximately $250 million. Because indexing's implementation would coincide with the beginning of the first full tax year in a biennium, the cost projection only covers the eighteen months beginning with January 1983. Indexing in future bienniums would cover the full twenty-four months.

TABLE 3.8
PROJECTED COST OF INDEXING, 1982-84 BIENNIUM

Fiscal Year	Actual Tax Revenues	Indexed Tax Revenues	Cost of Indexing	
			Amount	% Reduction in Revenues
1981-82	$1,445.8	...	...	...
1982-83	1,684.9	$1,597.6	$ 44.9	-2.6%
1983-84	1,969.9	1,775.7	194.2	-9.9

CHAPTER 4
INDEXING IN OTHER STATES AND NATIONS

Indexing by States

Since Chile began indexing in 1954, indexing has been adopted by fifteen nations, but it is a relatively new concept for states. Of the forty-four states with an individual income tax, nine--Arizona, California, Colorado, Iowa, Minnesota, Montana, Oregon, South Carolina, and Wisconsin--had adopted, as of 1980, some form of indexing (see Appendix Table A.3). At least seven other states--Delaware, Illinois, Kentucky, Michigan, New Jersey, New York, and Virginia--have considered proposals to adopt some form of indexing (see Appendix Table A.4).

The authors conducted a survey during the summer of 1980 of the nine states that have adopted indexing to assess the variety of existing and proposed indexing programs and to survey the legislative and administrative history of existing programs. They sent survey questionnaires to selected state department heads, research association staffs, and legislators who administer the tax or who played an important role in a bill's history. Twenty-four completed questionnaires, representing single or consolidated responses from forty-six of fifty-four individuals originally contacted, were returned. Each state is represented in the results.

Existing and Proposed Programs

Arizona, California, and Colorado adopted indexing legislation in 1978. In the following year, Iowa, Minnesota, Oregon, and Wisconsin passed indexing laws. During 1979, the Montana legislature also passed an indexing bill, but it was vetoed by the governor. In 1980, South Carolina enacted indexing legislation and Montana voters passed a referendum on a bill that will index their income tax system.

The indexing movement has developed largely in the western half of the nation and spread eastward. Eight of the nine states that have adopted indexing provisions are either western or midwestern states. Two additional midwestern states, Michigan and Illinois, considered indexing. The Michigan proposal was defeated in a November 1980 referendum. Illinois adopted legislation in 1978, but it was vetoed by the governor. Of the eastern and southern states, only South Carolina has adopted indexing, while five additional states have considered or are considering the idea.

The Advisory Commission on Intergovernmental Relations defines comprehensive indexation as "annually adjusting the three primary fixed-dollar features of the personal income tax--the income brackets, personal exemptions, and standard deduction."[1/] Five states--California, Colorado, Montana, Oregon, and South Carolina--of the nine with indexing laws, annually adjust all three of the primary features.

Indexing of tax brackets is the most common feature of indexing laws. Of the nine existing programs, only Arizona's does not index tax brackets; of the six proposed programs, only those of Illinois, Michigan and New York would not index tax brackets. The Illinois income tax is a flat 2.5 percent rate. The Delaware proposal would index tax rates rather than tax brackets. Rather than raising bracket boundaries to adjust for inflation, it would accomplish approximately the same result by lowering the marginal tax rate applicable at each bracket.

Indexing personal exemptions and the standard deduction are only slightly less common. Only two states with existing programs, Iowa and Wisconsin, do not index either feature. Minnesota and Oregon delayed indexing of personal exemptions until 1981. Minnesota also began indexing the standard deduction in 1981 (Oregon already did so). Of the proposed programs, only Kentucky's, Michigan's, and New Jersey's would not index the standard deduction and personal exemptions, while Illinois has no personal exemption feature.

Three states have phased in their indexing programs over a number of years. California indexed its tax brackets in 1978 and in the next year extended indexing to cover the standard deduction and personal exemptions. The belief that indexing was a good idea prompted its extension to the other features of the tax. Minnesota initiated indexing of its tax brackets in 1979. Revenue considerations and a 1979 increase in the deductions and credits were cited for delaying implementation of the other features until 1981. Beginning with tax year 1981, Oregon added personal exemptions to the features it indexes. None of the six indexing proposals employs gradual indexing.

Indexing was adopted as a permanent feature of the tax system except in Arizona, Iowa, and Oregon. Arizona chose indexing for one year in 1978 and then made it permanent in 1979. The Oregon law went through the same process, attaining permanence in 1980. Iowa, on the other hand, initially extended

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1/ Advisory Commission on Intergovernmental Relations, The Inflation Tax: The Case for Indexing Federal and State Income Taxes (Washington, D.C.: U.S. Government Printing Office, January 1980), p. 21.

indexing only through tax year 1981, but in 1980, it was made permanent. Indexing would be incorporated permanently into the tax systems by the six proposed programs.

Indexing in Iowa is conditional on the state's unobligated fund balance exceeding $60 million as of June 30 for each respective year. For tax years 1980 and 1981 combined, the condition applied to June 30, 1980, and it was not met.

ACIR model legislation does not address the issue of indexing capital gains or business depreciation. None of the states has passed legislation involving the indexing of these items, and only Arizona, Iowa, and Montana have addressed such legislation. In Arizona, this type of indexing was considered, but concern about revenue delayed its implementation. Iowa and Montana also considered the idea, but bills were never drafted.

Price Indexes Used

The ACIR model legislation, shown in Appendix A, uses the CPI for adjusting fixed dollar amounts. The CPI is in actual use in three states--Montana, South Carolina, and Wisconsin--and is a feature of programs proposed for Kentucky, New Jersey, and Virginia. In Arizona and Oregon a consumer price index for the state's major metropolitan area is used instead. Minnesota employed the CPI index for the Minneapolis-St. Paul Metropolitan area through 1980, but now uses either the metropolitan index or percentage increase in Minnesota Gross Income,[1/] whichever is smaller. California employs a statewide consumer price index developed from consumer price indexes for its major metropolitan areas.

Iowa employed the CPI during the initial year of its indexing program, but switched to the Gross National Product Implicit Price Deflator (IPD). Michigan is the only other state among those now considering indexing which would incorporate the IPD.

The Colorado and Delaware laws do not prescribe any particular index. In both cases, the index is to be determined yearly by the state legislature. Both laws stipulate that should the legislatures fail to select an index, the tax system would automatically be indexed by 6 percent.

ACIR's model legislation calls for full indexation for changes in the price level, but in actual practice some states limit the extent of indexation. South Carolina and Wisconsin limit the change in the price level which will be compensated for to 6 and 10 percent, respectively. Minnesota initially indexed for only 85 percent of the change in the price level, but for tax years beginning with 1981, Minnesota will index for the full change in the appropriate index. California excludes the first three percentage points from indexation, while Michigan's proposal would exclude the first two percentage points. Such provisions remove indexation during creeping inflation, a condition experienced in the past, but not in the last decade. An unusual feature of the California and Minnesota programs is the application of limits to only the tax bracket features; the personal exemptions and the standard deduction are indexed for the full change in the price level. In addition, California went through a period

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1/ An income concept used in the derivation of the Minnesota income tax.

of two years, 1980 and 1981, when the tax brackets were fully indexed for changes in the price level, but is scheduled to return to partial indexing in 1982. Finally, Iowa limited indexation to one-fourth of the change in the price index for 1979 and one-half of the change after that year.

Experience with Indexing

Support for indexing seems to have been relatively broad-based in most states. Taxpayer associations were frequently mentioned by respondents as organized proponents of indexing legislation. Other commonly mentioned support groups were business-backed organizations such as the Minnesota Association of Commerce and Industry and Iowans for Tax Relief. Both political parties supported indexing, except in Wisconsin and Minnesota, where the Republicans generally supported indexing and the Democrats (specifically, Wisconsin urban Democrats) generally opposed indexing.

Opposition to indexing was neither widespread nor intense. The most frequently mentioned organized opponents of indexing were labor affiliated organizations such as the AFL-CIO in Minnesota, the Minnesota Education Association, and the Iowan Tax Reform Action Coalition. The Urban League also offered opposition in Minnesota, while in Wisconsin, opposition came from the local governments. The California Department of Finance opposed indexing on the grounds that it would cost too much. In Montana, opposition came from the Montana Public Employees Association. In some cases, opposition was directed at the choice of indexing over other forms of tax reform, specifically property tax reform. No state indicated any significant move on the part of indexing opponents to seek repeal of the indexing legislation.

As would be expected, indexing resulted in a reduction in the rate of growth of tax revenues. The states have responded with relative uniformity to the shortfall in revenues caused by indexing. All seven states replying to the questions dealing with the revenue cost of indexing indicated that during the first year this cost was met by a reduction in the state's surplus. In Arizona, a growing tax base eased the cost burden, while Iowa cut its growth in expenditures to meet its reduced revenues.

As time passes, states adopt more varied responses to indexing-induced revenue shortfalls. California and Colorado have continued to offset revenue deficiencies with reductions in the state's surplus, but California expects budget cuts to be necessary within the near future. The impact in Colorado has been lightened by a statutory limitation on the growth of expenditures of 7 percent per year. The remaining five states all reported insufficient experience to determine the exact effect, but most expect reduced growth in expenditures to offset the loss of revenue. No state, with the exception of Minnesota, reported any increases in taxes or fees as a result of indexing, and the increased fees in Minnesota could not be directly attributed to indexing.1/

1/ Since the survey was conducted, it has been reported that several states have experienced budgetary problems, possibly as a result of indexing. "The Trouble with Indexing in Minnesota," Wall Street Journal, 31 August 1981 and John Shannon and Robert Lucke, "State Experimentation with Indexed Income Taxes--Early Results" (Advisory Commission on Intergovernmental Relations, November 1980).

The seven states with indexing experience agree that it has created no major administrative problems. The most common complaint was the need for annual updating of withholding tax schedules. Respondents also mentioned the need to make more extensive annual changes in tax forms than required without indexing. California did expect some problems for its taxpayers, since they would be unable to estimate their current year tax for estimated tax liability or withholding purposes from the previous year's withholding tables.

In regard to revenue forecasting, indexing appears to have generated few problems, none of major proportions. The most frequently mentioned problem is the increased risk involved in forecasting revenue. Future inflation rates must now be estimated, which decreases the reliability of revenue estimates. Minnesota indicated that its projection of future revenue is now more difficult because the distribution of income must be estimated. Prior to indexing, a simpler revenue/income elasticity method of forecasting was used. Iowa reported no problems so far, but respondents believe difficulties might develop if the unobligated fund balance approaches the $60 million trigger figure. Forecasting problems do not appear to be correlated with the frequency of the budget. Four states--Iowa, Minnesota, Oregon, and Wisconsin--have biennial budgets, but none indicated this as generating special problems.

Indexing by Foreign Nations

While indexing is a relatively new concept in the United States, it has been accepted for almost thirty years in other parts of the world. Chile began indexing its income tax in 1954. In the 1960's, Brazil, Denmark,[1] France, Iceland, Luxemburg, and Uruguay[2] adopted indexing laws. The 1970's saw Argentina, Australia, Canada, Israel, the Netherlands, Peru, Sweden, Switzerland, and the United Kingdom initiate indexing.

The methods of indexing vary. Only the most important provisions of the tax codes tend to be indexed. In most countries, the central government has some discretionary authority to determine which provisions to index and the rate at which they will be indexed. Only Argentina and Canada automatically index their three major provisions (exemptions, deductions, and tax brackets) for the full effect of inflation.

The Canadian indexing law is of greatest interest to the United States because the Canadian tax structure is similar to that of this country. The Canadian law annually indexes the personal exemptions, tax brackets, and some deductions for changes in the Canadian Consumer Price Index (CCPI) for the twelve-month period ending September 30 prior to the tax year. In 1979, the most recent year available, indexing resulted in a $1.2 billion (Canadian dollars) reduction in the federal tax burden.[3] Federal direct tax revenue as a

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1/ Denmark's law did not become effective until 1970.

2/ Uruguay abolished its income tax, and thus indexing, in 1974.

3/ Congressional Budget Office, Indexing the Individual Income Tax for Inflation (Washington, D.C.: U.S. Government Printing Office, September 1980), p. 57.

percentage of personal income has been reduced from 11.5 percent in 1974, the year of adoption, to 9.2 percent in 1978 as a result of indexing and discretionary tax cuts.1/

Indexing has considerably reduced the Canadian federal government's real revenue growth rate, from 18.8 percent in 1974 to 5.1 percent in 1979, with three of the six years registering negative growth. Indexing has also contributed to budget deficits in every year since 1974. The deficits have increased pressure to reduce the growth in federal expenditures, and since 1976, the real expenditure growth rate has not risen above 5.0 percent(there was even a decline in 1979), compared to an average growth of 10.0 percent over the previous six years.2/

Citing the size of the federal deficits, the current Canadian government headed by Prime Minister Pierre Trudeau has raised the idea of "de-indexing" the tax system. The projected budget deficit for the 1981 fiscal year is 23.7 percent of government spending.3/ Political objections to indexing have included a lack of credit attributed to legislators for tax savings due to indexing. Legislators have also objected to their inability to adjust indexing to enhance its flexibility because changes would be perceived as tax increases.4/

One advantage of indexing cited by its proponents is that the process has disciplined the government to expect lower revenues. It has prompted more serious reviews of new spending legislation and the source of funds to finance it.5/

With the exception of Quebec, the provincial income taxes are expressed as a percentage of federal taxes paid. Therefore, provincial income taxes are automatically indexed. Quebec does not index its income tax, but in 1980 it proposed its own indexing scheme. The tax would be indexed by a projected indexing rate rather than the historical rate commonly used in other methods.

1/ Ibid., pp. 56-58.

2/ Ibid., pp. 59-61.

3/ "Trudeau Takes Aim at Indexing," Wall Street Journal, 29 August 1980.

4/ Congressional Budget Office, Indexing the Income Tax, p. 59.

5/ Ibid., pp. 57-59, and Jerry Edgerton, "The Tax Reform You May Need Most," Money (June 1978), pp. 48-51.

CHAPTER 5
ARGUMENTS FOR AND AGAINST INDEXING

Introduction

Indexing is only one of a number of alternatives available to governments to control the growth in the public's tax burden, and there is no consensus that indexing offers the best solution. This section lists and discusses the arguments for and against indexing; the section also contains rebuttals. Because state governments, unlike the federal government, operate under balanced budget restrictions, some of the arguments normally cited in the literature addressing federal indexing do not apply to states. The arguments cataloged below are those relevant to state governments.

Arguments for Indexing

Fiscal Accountability

During inflationary periods, under a progressive income tax system with fixed dollar features, unlegislated increases in the effective tax rates will occur. These increases in the public's tax burden occur largely with little public knowledge or debate. Legislators can benefit politically from these automatic tax increases: (1) by increasing public services without directly increasing taxes or cutting other services; or (2) by enacting popular tax cuts. But these tax cuts offer no real tax reduction, since the public is no better off than it was prior to the inflation induced increase in effective tax rates. Moreover, the tax cuts may not entirely offset the inflation-induced increase.

Indexing the tax system would eliminate unlegislated increases. Any tax increase would require public disclosure and debate before its enactment. Public officials would be forced to defend proposals to increase spending and to

reveal the source of funds. Legislators would be directly responsible for their spending and tax proposals and would have to accept the political consequences of their actions.

Rebuttal.--"Unlegislated tax increases" is a misleading phrase. The tax system can be changed at any time. If the tax is not adjusted for the effects of inflation, the absence of adjustment is an implicit endorsement of the present tax system by elected representatives. Therefore, there is no need to automatically adjust the tax by indexing.

Tax Equity

Inflation causes increases in the effective tax rates over and above any increase due to real growth in income for all income classes. While all groups are burdened by inflation, the effect is not equal among taxpayers. Inflation alters the existing legislated distribution of the tax burden. Because of the importance of the standard deduction and personal exemptions to low-income and large families, inflation places the heaviest relative burden on these households. As inflation reduces the real value of the standard deduction and personal exemptions, a greater portion of real income is taxable. High-income taxpayers also bear a heavier burden. For some states, not including Virginia, the marginal tax brackets are relatively narrower at the higher income levels than at lower income levels, so inflation pushes higher income households into higher marginal tax brackets faster than lower income households.

Indexing the income tax would remove these distortions in the distribution of the tax burden. Assuming society deems the legislated tax system equitable, indexing would assure that equity was maintained and that any changes in the distribution of the tax burden would be subject to public debate concerning the equity of the proposed revisions.

Rebuttal.--The existing tax structure is not sacrosanct; it can be changed by the legislature at any time. If the elected representatives of the people feel that the burden is distorted in favor of high-income individuals, they can make the appropriate adjustments without resorting to indexing.

Public Sector Growth

Inflation has encouraged the growth of government. By continually pushing up the effective tax rate, inflation causes a faster rate of growth for tax revenues than for income. This results in a growing proportion of society's overall resources being shifted from the private sector's to the public sector's control. A continuously increasing share of income is targeted as tax revenue, subject to government control. This provides little incentive to seriously question the need for additional government spending, since the necessary funds are automatically available at little or no political cost and no perceived real cost.

While indexing will not reduce the size of government, it can slow its rate of growth so that government maintains its current size, relative to the private sector, unless an active decision is made to alter it. This slowdown in the growth of government tax revenues will require more serious consideration by legislators of new or expanded government programs and of the sources of funds to finance such programs. Surplus funds, over and above those needed to finance

current levels of existing programs, will no longer be automatically available. The true cost of new government services will be more recognizable as the tax cost or redirection of other expenditures necessary to finance them.

Rebuttal.--The voting public is well aware of the growth in tax revenue from an unindexed system but it tolerates that outcome because it recognizes the need to raise more revenue as government costs rise, frequently faster than the general rate of inflation. With indexation, it would be necessary to spend unnecessary time and resources to raise taxes annually in order to fund essential government outlays.

Intergovernmental Fiscal Balance

Not only does inflation cause an increase in the overall size of government, it also results in a shifting of resource concentration within government from lower to higher levels. The ability of different levels of government to benefit from inflation differs. The federal government has the greatest potential to realize revenue increases due to inflation because it relies most heavily on the personal income tax. On the other hand, local governments' minimal use of income taxes leaves them little opportunity to reap revenue increases from inflation.1/ As inflation increases tax revenues, a greater portion of this increase is shifted to the higher levels of government.

If the current mix is the optimal or preferred distribution of resources among governments, inflation results in an inefficient reallocation. Indexing the income tax would aid in the preservation of the current distribution of resources among the various levels of government.

Rebuttal.--There is no fixed fiscal interrelationship among levels of government. The size of each level at any point in time depends upon the functions to be performed and voter preferences. In the last decade, property taxes declined in relative importance as a major revenue source while income taxes rose.2/ To insist that the shares should have been stable ignores voters' antipathy toward property taxes and their preference for other tax sources.

Arguments Against Indexing

The CPI Overstates Inflation

The price index with the greatest public recognition and the most widespread use is the CPI, the U.S. Consumer Price Index for all Urban Consumers. Unfortunately, the CPI overstates the rate of inflation. The principal reason for this outcome is the treatment of home ownership costs. The index gives excessive weight to this category and treats all existing mortgages as if they had the interest rate applicable to new mortgages. Another problem is that the CPI relies on a fixed market basket of goods and services. As prices rise, the

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1/ In Virginia, local governments are prohibited by statute from imposing an income tax.

2/ In 1972, property taxes accounted for 38.7 percent of total tax collections for all state and local governments. By 1980, their share was 30.5 percent. Source: Advisory Commission on Governmental Relations, Significant Features of Fiscal Federalism, 1979-80 Edition M-123 (Washington, D.C.: U.S. Government Printing Office, October 1980), p. 64.

fixed market basket feature of the CPI does not reflect the resulting alterations in consumers' buying habits. Consumers will alter their purchases from more expensive to less expensive goods. The CPI does not reflect the reduced importance of higher priced goods and the increased importance of lower priced goods in consumers' budgets. Therefore, the CPI fails to measure the true effect of inflation on consumers.1/

Since the CPI overstates the rate of inflation, indexing the income tax for changes in the CPI will cause insufficient tax revenues. Rather than gaining from inflation, as it has been doing, government will be losing. Government will not be able to maintain the current level of services, and either tax rates must rise, or service levels must be cut.

Rebuttal.--Unquestionably, the CPI has overstated the rate of inflation in recent years. In 1980, when the CPI rose 13.5 percent, the PCE, the index used to convert personal consumption to constant dollars, rose by 10.2 percent. This disparity may not be as large in future years if residential mortgage rates fall and housing prices rise at a slower rate. Because of present dissatisfaction with the CPI, it is quite likely that the index will be changed in the near future.2/ The major change would be to compute homeowner housing costs on a rental equivalent basis.

One alternative would be partial indexing, as used in California, Minnesota, South Carolina, and Wisconsin. Partial indexaton places a cap on the annual percentage change that will be indexed, establishes a proportion of the price change to be indexed, or subtracts a fixed percentage change before indexing.

Another alternative is to use a different index than the CPI. The PCE is one of several alternative indexes. The major issue is to adjust the tax structure for the impact of inflation. The choice of an appropriate index is a relatively minor problem.

Inflation's Effects Vary Across Groups

The CPI is a broad index, measuring price changes in a typical market basket of goods and services reflecting the purchases of an average household. The purchases of the poor and wealthy are not truly measured by this typical market basket, but instead, are weighted more heavily towards necessities and luxuries, respectively. Prices of necessities (luxuries) have been rising faster (slower) than prices in general.3/ Indexing for changes in the CPI would thus understate (overstate) the effect of inflation on low-(high-)income households.

1/ For more complete discussions of the limitations of the CPI see Congressional Budget Office, Indexing With the Consumer Price Index: Problems and Alternatives (Washington, D.C: U.S. Government Printing Office, June 1981) and Gordon, "The Consumer Price Index," pp. 112-34.

2/ The Comptroller General of the United States, Measurement of Homeownership Costs in the Consumer Price Index Should Be Changed PAD-81-12 (Washington, D.C.: U.S. Government Printing Office, April 16, 1981).

3/ Gar Alperovitz and Jeff Faux, "Controls and the Basic Necessities," Challenge 23, No. 2 (May/June 1980), pp. 21-29.

Rebuttal.--No widely agreed upon price index for lower income groups exists. A necessities index computed by the National Center for Economic Alternatives arbitrarily omits clothing and includes restaurant meals. An alternative form of the necessities index actually increased at a slightly lower average annual rate for 1970-79 than the CPI. Rather than attempt the hopeless task of designing separate price indexes for an unlimited number of special groups and circumstances, a better policy is to rely on a general index which provides a broad measure of inflation.1/

Rapid Growth of Government Costs

Government has been experiencing rising prices just as the general public has, but government costs have been rising faster than prices in general. Between 1970 and 1980, the price index for state and local government purchases increased faster than the CPI in six of the ten years. Only in the last three years has the CPI consistently exceeded the state and local government deflator (see Table 5.1). The more than proportionate increase in tax revenues induced by inflation has helped government offset its rising costs.

Indexing would inhibit the state government's ability to maintain current service levels in the face of rising costs. Without the inflation tax revenue, cuts in government services or legislated tax increases would be required. The automatic increase in tax rates permits avoidance of the cumbersome legislative process.

Rebuttal.--Undoubtedly, the increased revenue from an unindexed income tax has helped state governments to meet rising costs. But in a period of changing relative costs between private and government sectors, voters should be given the choice of higher taxes or fewer services instead of being confronted with automatic tax increases for the maintenance or expansion of services.

Periodic Tax Cuts

The basic argument for indexing the income tax is that increases in taxes should be subject to public disclosure and debate. The same purpose can be served through periodic tax cuts enacted by the legislature. Periodic tax cuts adopted to offset the effects of inflation provide a forum for public discussion of tax changes. Debate over the size and type of cuts offers the same opportunity for public reaction as automatic indexing and discussion of tax increases. Periodic cuts also enable legislators to better maintain an equitable distribution of the tax burden. Readjustments of the tax burden can be made at the same time as inflation offsetting tax cuts. Discretionary tax cuts provide an additional advantage in that they provide legislators greater control over the budgetary process. Tax cuts can be expanded or contracted

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1/ Joseph J. Minarik, "Inflation in the Necessities?," The Brookings Bulletin 16, No. 4 (Spring 1980), p. 9; see also: Joseph J. Minarik, "A Critique" Challenge 23, No. 6 (January/February 1981), pp. 44-47 and in the same issue, Gar Alperovitz and Jeff Faux, "Missing the Point: A Reply," pp. 48-49 and Joseph Bowring, "Necessities Inflation and Distributional Impact," pp. 50-52; and Donald E. Pursell, "An Alternative View of Necessities Inflation," Challenge 23, No. 5 (November/December 1980), pp. 49-52.

according to revenue needs. Indexing would require tax increases or spending cuts, neither of which is politically popular or easy to secure; both face greater special interest group opposition than tax cuts.

Rebuttal.--Periodic cuts to offset the effects of inflation are fine in theory but have been absent in practice. Since 1972, the year the Virginia individual income tax structure was last adjusted, prices have nearly doubled, yet no significant adjustments have been made. The rate brackets, maximum standard deduction, and exemptions remain at their 1972 levels. Even if discretionary cuts had been made, some argue that automatic changes via indexing would have simplified the legislative process and made tax burden predictable.

TABLE 5.1
COMPARISON OF INFLATION RATES AS MEASURED BY THE CPI AND THE STATE AND LOCAL GOVERNMENT DEFLATOR

	Percentage Change from Preceding Year	
Year	CPI	State and Local Government Deflator
1971	4.3	6.9
1972	3.3	5.6
1973	6.2	6.9
1974	11.0	9.8
1975	9.1	9.3
1976	5.8	6.8
1977	6.5	6.6
1978	7.7	7.5
1979	11.3	8.2
1980	13.5	8.8

Source: Economic Indicators (February 1981), p. 2.

CHAPTER 6
THE CURRENT STATUS OF INDEXING IN VIRGINIA

The problem of inflation-induced increases in tax liabilities has been the subject of political debate in Virginia. Proposed solutions have encompassed both indexation and tax limitation measures. While neither method has yet been adopted, both have received considerable discussion in the General Assembly.

Review of Recent Bills

In the 1979 and 1980 legislative sessions, a number of tax limitation bills were introduced. The majority were proposed amendments to the Virginia Constitution. The bills provided limitations on either growth in expenditure or growth in appropriations, both about equal in popularity. One amendment did propose limited growth in revenues. All but one, Senate Joint Resolution (S.J.R.) 73, introduced in 1980, died in committee. By and large, the proposals were fairly standard. Common provisions included a clause preventing imposition of any new programs or expansions of existing services on local governments unless completely funded by the state. Another feature often included was that the share of total state tax revenue going to localities in the aggregate could not be reduced. Finally, many bills required that excess revenues be dispersed to local governments according to population, and in those localities with an effective tax rate in excess of $1.00 per $100 of true real property, the excess reserves be used for property tax relief.

Indexing legislation (House Bill 637) was also introduced during the 1980 General Assembly session. House Bill 637 proposed indexation for the three major features--brackets, standard deduction, and personal exemptions--of the tax system. Proposed to take effect in the 1981 tax year, H.B. 637 would have indexed the income tax for changes in the CPI as measured by the ratio of the index for the twelve-month period ending May 31 of the preceding tax year. The legislation did not address capital gains or the business income taxes. The Virginia Department of Taxation, in its legislative review, found few administrative problems; administrative costs were forecast to be minimal, about $65,000 to $75,000 annually. Revenue costs were projected at $240 million for fiscal year 1982. The legislation died in committee.

The 1981 legislative session featured new attempts to deal with the inflation tax problem. Three tax limitation bills were introduced during the 1981 session. Two, H.J.R. 166 and S.J.R. 161, were identical constitutional amendments submitted in each house. The amendment was adopted by both houses. The adopted amendment provides for a limit to the rate of growth of appropriations from tax revenue in each biennium equal to the estimated rate of growth of the Virginia economy during the same biennium. Appropriations in excess of the limit would require a two-thirds vote of each house. The third tax limitation bill would have restricted growth in general fund appropriations to no more than 7 percent over the previous year's appropriations. This bill died in committee.

Two acts to index the personal income tax were also introduced in 1981. House Bill 1647 provided for indexation of the marginal rate brackets, while H.B. 1720 would have also indexed the standard deduction and the personal exemptions. (See Appendix B for an excerpt from H.B. 1720). Both bills would have taken effect in the 1982 tax year and would have used the CPI as the measure of inflation. The indexed features would have been inflated by the ratio of the index for the twelve-month period ending May 31 of the tax year to the index for the same period in the preceding tax year. Neither bill would have resulted in substantial additional administrative expenses, according to summaries by the Department of Taxation. Department estimates of foregone revenues for H.B. 1647 were $330 million for the eighteen month period encompassing tax year 1982 and the first six months of tax year 1983. For fiscal year 1984, the cost was estimated to be $500 million. For H.B. 1720, the estimated cost was $390 million and $580 million for the same two time periods, respectively. Both bills died in committee.

Legislative Opinion

In order to obtain opinions from members of the House of Delegates about recent indexing legislaiton and about prospects for future adoption, the authors sent questionnaires to advocates and opponents. Their opinions are summarized below.

An indexing bill has not passed in Virginia because of the high cost, concern about its effect on the budget process, and the attractiveness of other, competing forms of tax reduction. Frequently mentioned alternatives are: (1) a return to conformity with federal exemption and standard deduction amounts; and (2) elimination or reduction of the state sales tax on food purchased for home consumption.

Some delegates feel that the passage of a constitutional amendment limiting the growth of state government would have no effect on the prospects for indexation, while other feel the amendment would remove the need to index. Another viewpoint is that indexation prospects would be unaffected because indexing complements expenditure control by reducing the growth of tax revenue.

Opponents of indexing cite recent cutbacks in federal aid to the state and reductions in state tax revenue due to federal tax changes as developments that cast a shadow on the prospect for any form of state tax relief, including indexing. Proponents believe that the cutbacks are not as large as generally perceived and that the changes in aid often involve smaller increases rather than absolute reductions. For these reasons, proponents feel that state indexing is still feasible.

Legislators are uncertain about how the recent federal adoption of indexing will affect the prospects for indexing at the state level. Some delegates feel that indexing of the federal income tax will promote familiarity with the practice and stimulate state acceptance. Other legislators think that federal indexing will cause a reduction in federal aid to the state; with less aid, the state would be in a poor position to index.

APPENDIX A
ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS MODEL INDEXING LEGISLATION

[AN ACT TO REQUIRE DISCLOSURE OF
THE INFLATIONARY IMPACT ON
INDIVIDUAL INCOME TAX REVENUE
AND TO PROVIDE FOR ANNUAL ADJUSTMENT OF
KEY PERSONAL INCOME TAX ELEMENTS
FOR INFLATION]

(Be it enacted, etc.)

SECTION 1. Short Title. This act may be cited as the "[State] Income Tax Indexation Act."

SECTION 2. Findings and Purpose

(a) The [legislature] finds that inflation erodes the value of personal exemptions, deductions and tax credits in the [state] individual income tax structure and distorts fiscal equity among taxpayers. The [legislature] finds, further, that inflation-induced increases in individual income tax revenues result in annual collections that exceed the amounts anticipated by legislative actions establishing rates, exemptions, deductions, and other features of the [state] individual income tax.

(b) It is the purpose of this act to correct these situations by:

(1) requiring that the Governor prepare an annual estimate of the impact of inflation on individual income tax collections; and

(2) requiring that certain elements of the individual income tax structure be adjusted in accordance with annual increases in the Consumer Price Index.

SECTION 3. Definitions. As used in this act:

(a) "Inflation factor" means the ratio of the Consumer Price Index for the 12-month period ending [June 30] [September 30] of the current tax year to the Consumer Price Index for the immediately preceding tax year, rounded to the nearest one-thousandth.

(b) "Consumer Price Index" means the average over a 12-month period of the Consumer Price Index published monthly by the Bureau of Labor Statistics, U.S. Department of Labor [as adjusted by the [state statistical or economic development agency]].

SECTION 4. Annual [Biennial] Estimate of Inflationary Impact on Individual Income Tax Revenues. The Governor shall include in the [annual] [biennial] executive budget an estimate for the previous year, the current year and the following [budgeted] year of the amount of actual or anticipated revenue from the individual income tax that can be reasonably attributed to inflation. These estimates shall be highlighted in the budget message, [the economic message, and the state of the state address] and included prominently in press releases relating to the budget.

SECTION 5. Adjustments for Inflation.

(a) The [state statistical agency] [state economic development agency] shall annually by [July 15] [October 15] prepare and promulgate an inflation factor for the tax year for use by the [state department of revenue] in making the adjustments required in subsection (b) of this section. In preparing the inflation factor, the [state statistical] [state economic development agency] shall, using the best statistical techniques compatible with those used by the U.S. Department of Labor in preparing the monthly Consumer Price Index, adjust the Consumer Price Index to conform most nearly to the situation that exists in this state.

(b) Sections [refer to sections of the state individual income tax law relating to tax rate brackets, personal exemptions, per capita credits, and minimum and maximum standard deductions] are amended by adding to the end of each the following new subsection:

"Upon promulgation of the inflation factor under Section 5(a) of this act, the [head of the department of revenue] shall multiply each dollar amount set forth in this section, as adjusted under this subsection in the immediately preceding tax year, by the inflation factor. If the inflation factor for the current tax year is less than [1.000] [1.030] [other], no further adjustment shall be made and the [exemption, brackets, deductions, etc.] shall be as determined for the immediately preceding tax year.1/

SECTION 6. Separability. [Insert separability clause]

SECTION 7. Effective Date. [Insert effective date]

Source: Advisory Commission on Intergovernment Relations, The Inflation Tax: The Case for Indexing Federal and State Income Taxes (Washington, D.C.: U.S. Government Printing Office, January 1980).

1/ The dollar amount to which the inflation factor is applied in each year is the dollar amount determined in the preceding tax year through the use of the inflation factor.

APPENDIX B
HOUSE BILL 1720 SECTION ON INDEXING

A BILL to amend and reenact §58-151.011, 58-151.013, and 58-151.3 of the Code of Virginia, and to amend the Code of Virginia by adding a section numbered 58-151.011:1, the amended and new sections providing a method of taxing personal income.

Be it enacted by the General Assembly of Virginia:

1. That §58-1512.011, 58-151.013, and 58-151.3 of the Code of Virginia are amended and reenacted, and that the Code of Virginia is amended by adding a section numbered 58-151.011:1 as follows:

58-151.011. Rates of tax.--Except as otherwise provided in §58-011.1, the rates of tax annually imposed upon every individual upon and with respect to his Virginia taxable income for each taxable year are as follows:

Two percent of the amount of such income not exceeding $3,000;

Three percent of the amount of such income in excess of $3,000, but not in excess of $5,000;

Five percent of the amount of such income in excess of $5,000, but not in excess of $12,000; and

Five and three-fourths percent of the amount of such income in excess of $12,000.

58-151.011:1. Inflation adjustment.-A. For each taxable year beginning on and after January 1, 1982, the following dollar amounts set forth in this article shall be adjusted by the inflation factor defined in subsection B:

1. The minimum and maximum dollar amounts for each rate bracket set forth in §58-151.011:

2. The minimum and maximum standard deduction amounts prescribed under subsection (d) (2) of §58-151.013; and

3. The personal exemption amounts prescribed by subsection (d) (3) of 58-151.013.

B. For the purposes of this section:

1. The "inflation factor" means the ratio of the average Consumer Price Index for the 12 months ending May 31 of the taxable year, to the average Consumer Price Index using the same base year for the 12 months ending May 31 of the immediately preceding taxable year, rounded to the nearest one thousandth.

2. The "average Consumer Price Index" means the average over a 12-month period of the Consumer Price Index, All Items, All Urban Consumer, published monthly by the United States Bureau of Labor Statistics.

APPENDIX C
ESTIMATING THE COST OF INDEXING

Historical Costs

Estimates of the cost of indexing the personal income tax for tax years 1973 through 1979 were derived from aggregate data on adjusted gross income (AGI) obtained from the Virginia Department of Taxation. The data included aggregate AGI, personal exemptions, itemized and standard deductions, taxable income, income taxable at each marginal tax rate, and taxes payable.

For any tax year, the cost of indexing is derived through the following manipulations (for a mathematical example see Appendix Table A.5). The first step is to reduce AGI by itemized deductions. Itemized deductions are not adjusted by the index factor because it is assumed their value keeps pace with inflation.1/ Next, the sum of personal exemptions and standard deduction adjusted by the cumulative inflation index is subtracted. The cumulative index factor is the product of the index factor for each year since base year 1972. The resulting sum equals adjusted taxable income. Adjusted taxable income is subtracted from actual taxable income, the difference being the reduction in taxable income due to indexing the exemption and the standard deduction.

The difference between adjusted and actual taxable income is distributed among the taxable income at each marginal tax rate according to each bracket's share of actual taxable income. Each bracket's share of the difference is subtracted from its taxable income. An additional adjustment for each bracket involves reducing its taxable income, beginning with the highest bracket, by a factor of $(a-1) \div a$, where a equals the cumulative index factor. The amount by

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1/ The index factor is the percentage change in the CPI lagged one year.

which each bracket's taxable income is reduced is added to the income taxable at the next lower rate, giving adjusted income taxable at each marginal tax rate.1/

Multiplying adjusted taxable income for each marginal tax rate by its respective rate and summing gives indexed taxes payable. The difference between actual and indexed taxes payable is the cost of indexing for the year.

Projected Costs

The estimates for indexing's cost for 1973 through 1979 were used along with data on actual tax revenues and inflation to project the cost of indexing for future years.2/ For 1972 through 1979, the log of the percentage change in indexed tax revenues was regressed on the log of the percentage change in actual tax revenues and the log of the price index factor. The equation, with t statistics in parentheses, is:

$$\text{Log ITR} = \underset{(8.54)}{1.19213\ \text{ATR}} - \underset{(-2.21)}{0.43578\ \text{Log CPI}}.$$

Both coefficients are significant at the 95 percent confidence level. Tests for multicolinearity between the two independent variables did not indicate a problem.

Using projections for the two independent variables for fiscal years 1980 through 1982, projections of the percentage change over the previous year for indexed tax revenues were developed.

1/ This adjustment is made to approximate the effect of indexing the marginal tax bracket boundaries. The aggregated data prevent the actual indexing of the boundaries, so this adjustment attempts to redistribute taxable income among the different rate classes similar to the redistribution that would occur if the boundaries were adjusted. The major drawback to this method is the implicit assumption that the relative distribution of income is unaffected by inflation.

2/ Projections of tax revenue and the CPI were obtained from the Virginia Department of Taxation, June 22, 1981.

STATISTICAL APPENDIX

TABLE A.1
STATE SPENDING LIMITATIONS AS OF NOVEMBER 1979

State	Nature of Limitation	Approved by	Applicable to	Basis
Az.	Permanent	Voters	Appropriations from state tax revenue	Cannot exceed 7 percent of total state personal income
Cal.	Permanent	Voters	Limits growth in state spending from tax proceeds	Lesser of: (a) growth in U.S. Consumer Price Index plus population growth; or (b) growth in state per capita personal income plus population growth
Col.	Temporary[a/]	Legislation	Annual increases in state spending	Limited to 7 percent
Ha.	Permanent	Voters	(1) Limits increases in state general fund spending (2) Limits debt service payments	(1) Limited to rate of growth in state economy (2) Limited to specified percentage of general fund revenue
Mich.	Permanent	Voters	State cannot incur expenses which exceed the sum of the revenue limit, federal aid, and prior surplus	Revenue limit: as set by constitutional formula
Nev.	Permanent	Legislation	State budget for any 2-year period, other than for construction	Base period: 2-year budget beginning July 1975, adjusted for population changes and consumer price index changes
N.J.	Permanent	Legislation	Expenditures other than from federal grants, or those paid to local governments or for debt service	Expenditure increases limited to growth in per capita personal income since base year
Ore.	Temporary[b/]	Legislation	Growth of state government appropriations for general government purposes	Limited to rate of growth of personal income in Oregon in 2 preceding calendar years
S.C.	Permanent	Legislation	State spending	Limited to 95 percent of current year's revenues with any remainder to be put into special reserve fund

TABLE A.1 (cont.)
STATE SPENDING LIMITATIONS AS OF NOVEMBER 1979

State	Nature of Limitation	Approved by	Applicable to	Basis
Tenn.	Permanent	Legislation[c/]	Rate of growth in state appropriations from state tax revenues	Rate of growth in state economy, based upon personal income within state and a projected economic index
Tex.	Permanent	Voters	Rate of growth of appropriations from nondedicated state tax revenues	Limited to rate of growth of state economy
Utah	Permanent	Legislation	State government appropriations	Cannot exceed a specific limit determined by formula, based upon prior year appropriation adjusted by growth in personal income
Wash.	Permanent	Voters	State tax revenue	Growth in general state revenue limited to growth in Washington personal income

Source: Council of State Governments, The Book of the States: 1980-1981 (Lexington, Kentucky: Council of State Governments, 1980), p. 291.

Note: Although these spending limits are applicable as indicated, most of the states made provisions for exceptions, generally pertaining to expenditures for debt service on existing state debt.

a/ A proposed constitutional amendment limiting state spending was defeated by the voters in November 1978. The state legislature initially passed the spending limit, effective through 1982-83, then extended the limit indefinitely after the proposed constitutional amendment was defeated.

b/ Applies only to the biennium beginning July 1, 1979. A proposal to permanently limit increases in state operating expenses was defeated by the voters in November 1978.

c/ Implemented by a constitutional amendment.

TABLE A. 2
VALUE OF VIRGINIA FIXED DOLLAR FEATURES ASSUMING INDEXING SINCE 1972, TAX YEARS 1973-81

		Inflation Adjusted[a/]			
	Actual, 1972	1973	1974	1975	1976
Exemptions:					
Personal, dependent, blind	$ 600	$ 620	$ 658	$ 731	$ 797
65 or over	1,000	1,033	1,097	1,218	1,329
Standard deductions:					
Percentage	15% of AGI	15% of AGI	15% of AGI	15% of AGI	15% of AGI
Maximum:					
Married, joint or single	2,000	2,066	2,194	2,435	2,657
Married, separate	1,000	1,033	1,097	1,218	1,329
Minimum:					
Married, joint or single	1,300	1,343	1,426	1,583	1,727
Married, separate	650	671	713	792	864
Net taxable income brackets:					
Rates: 2%	$ 0- 3,000	$ 0- 3,099	$ 0- 3,291	$ 0- 3,653	$ 0- 3,986
3%	$3,001- 5,000	$3,100- 5,165	$3,654- 5,485	$3,987- 6,089	$3,987- 6,643
5%	$5,001-12,000	$5,166-12,396	$5,486-13,165	$6,090-14,613	$6,644-15,942
5.75%	Over $12,000	Over $12,396	Over $13,165	Over $14,613	Over $15,942
Percentage change in CPI in preceding calendar year		3.3%	6.2%	11.0%	9.1%

		Inflation Adjusted[a/]			
	1977	1978	1979	1980	1981
Exemptions:					
Personal, dependent, blind	$ 843	$ 898	$ 967	$1,076	$1,221
65 or over	1,406	1,497	1,612	1,794	2,036
Standard deductions:					
Percentage	15% of AGI	15% of AGI	15% of AGI	15% of AGI	15% of AGI
Maximum:					
Married, joint or single	$2,811	$2,994	$3,224	$3,588	$4,072
Married, separate	1,406	1,497	1,612	1,794	2,036
Minimum:					
Married, joint or single	$1,827	$1,946	$2,096	$2,333	$2,648
Married, separate	914	973	1,048	1,166	1,323
Net taxable income brackets:					
Rates: 2%	$ 0- 4,217	$ 0- 4,491	$ 0- 4,837	$ 0- 5,384	$ 0- 6,111
3%	$4,218- 7,028	$4,492- 7,485	$4,838- 8,061	$5,385- 8,972	$ 6,112-10,183
5%	$7,029-16,867	$7,486-17,963	$8,062-19,347	$8,973-21,533	$10,184-24,440
5.75%	Over $16,867	Over $17,963	Over $19,347	Over $21,533	Over $24,440
Percentage change in CPI in preceding calendar year	5.8%	6.5%	7.7%	11.3%	13.5%

a/ Based on the annual change in the consumer price index, lagged one year.

TABLE A.3
EXISTING STATE INCOME TAX INDEXING PROGRAMS

State	Date Adopted/ Effective Date	Duration	Price Index	Major Features Indexed: Brackets	Standard Deduction	Personal Exemptions	Cap. Gains or Bus. Deprec.	First Year Cost Absorption	Budgetary Period
Az.	1978/1978	Permanent (As of 1979)	Phoenix Metro CPI	No	Yes	Yes	No	Surplus; Growth in tax base	Annual
Cal.	1978/1978	Permanent	California CPI	Yes[a/] (less 1st 3% points)	Yes (As of 1979)	Yes (As of 1979)	No	Surplus	Annual
Col.	1978/1978	Permanent	Determined yearly by General Assembly	Yes	Yes	Yes	No	Surplus	Annual
Iowa	1979/1979	Permanent[b/] (As of 1980)	1979: U.S. CPI: IPD thereafter	Yes[c/]	No	No	No	Surplus; lower growth in expenditures	Biennial
Minn.	1979/1979	Permanent	Metro CPI or Mn. Gross Income[d/]	Yes[e/]	Yes (As of 1981)	Yes (As of 1981)	No	Surplus	Biennial
Mont.	1980/1981	Permanent	U.S. CPI	Yes	Yes	Yes	No	. . .	Biennial
Ore.	1979/1979	Permanent (As of 1980)	Portland Metro CPI	Yes	Yes	Yes (As of 1981)	No	Surplus	Biennial
S.C.	1980/1982	Permanent	U.S. CPI	Yes (≤6%)	Yes (≤6%)	Yes (≤6%)	No	. . .	Annual
Wis.	1979/1980	Permanent	U.S. CPI	Yes (≤10%)	No	No	No	Surplus	Biennial

a/ For tax year 1980 and 1981, the brackets are to be indexed for the full change in the price index.

b/ Conditional on the state's unobligated fund balance exceeding $60 million as of June 30 for each respective year.

c/ For 1979, the brackets were indexed for one-fourth of the percentage change in the price index. Thereafter, the brackets will be indexed for one-half of the change.

d/ Minnesota employed the metropolitan CPI index through 1980, but now uses either the metropolitan index or the percentage change in Minnesota Gross Income, whichever is smaller.

e/ For tax years through 1980, the brackets were indexed for 85 percent of the index.

TABLE A.4
PROPOSED STATE INCOME TAX INDEXING PROGRAMS

State	Current Status	Duration	Price Index	Major Features Indexed: Brackets	Standard Deduction	Personal Exemptions	Cap. Gains or Bus. Deprec.	Budgetary Period
Delaware	Died in committee 1979	Permanent	Determined by General Assembly	Tax Rates	Yes	Yes	No	Annual
Illinois	Vetoed by Governor, 1978[a/]	Permanent	U.S. CPI	No[b/]	Yes	No[c/]	No	Annual
Kentucky	Died in committee 1979	Permanent	U.S. CPI	Yes (less first 3% points	No	No	No	Biennal
Michigan	Rejected by voters in November 1980 referendum	Permanent	IPD	No	No	Yes (less 2% points)	No	Annual
New Jersey	In committee	Permanent	U.S. CPI	Yes	No	No	No	Annual
New York	In committee	Permanent	U.S. CPI	No	Yes	Yes	No	Annual
Virginia	Died in committee 1981[d/]	Permanent	U.S. CPI	Yes	Yes	Yes	No	Biennial

a/ Similar bills have been introduced in subsequent years but have not made it out of the legislature.

b/ The Illinois income tax is a flat rate of 2.5%.

c/ There are no allowed exemptions.

d/ Similar bills had been introduced in previous years but have also died in committee.

TABLE A.5
COMPUTATION OF THE ESTIMATED COST OF INDEXING, TAX YEAR 1976

		Dollars	
1.	AGI		24,302,035,794
2.	Less: Itemized deductions		2,714,551,954
3.	Less:		
4.	Exemptions	2,792,782,800	
5.	Standard deductions	1,807,011,160	
6.	Subtotal	4,599,793,960	
7.	Cumulative inflation index (a)	x 1.3285	6,110,826,276
8.	Indexed taxable income		15,476,657,564
9.	Actual taxable income		17,004,157,324
10.	Less: line 8		15,476,657,564
11.	Difference		1,527,499,760
12.	Income taxable at 5.75%		3,579,543,091
13.	Less: (line 12 ÷ line 9) x line 11		321,538,699
14.	Subtotal before adjustment of bracket size		3,258,004,392
15.	Less: (a-1)÷a x line 14		805,704,486
16.	Adjusted income taxable at 5.75%		2,452,299,906
17.	Income taxable at 5%		5,187,405,642
18.	Less: (line 17 ÷ line 9) x line 11		466,040,177
19.	Subtotal before adjustment of bracket size		4,721,365,465
20.	Less: (a-1)÷a x line 19		1,167,593,679
21.	Plus: (a-1)÷a x line 14		805,704,486
22.	Adjusted income taxable at 5%		4,359,476,272
23.	Income taxable at 3%		2,782,529,399
24.	Less: (line 23 ÷ line 9) x line 11		249,898,961
25.	Subtotal before adjustment of bracket size		2,532,630,438
26.	Less: (a-1)÷a x line 25		626,319,507
27.	Plus: (a-1)÷a x line 19		1,167,593,679
28.	Adjusted income taxable at 3%		3,073,904,610
29.	Income taxable at 2%		5,454,740,297
30.	Less: (line 28 ÷ line 9) x line 11		490,021,923
31.	Subtotal before adjustment of bracket size		4,964,718,374
32.	Plus: (a-1)÷a x line 25		626,319,507
33.	Adjusted income taxable at 2%		5,591,037,881
34.	Adjusted taxable income x marginal tax rate = taxes payable		
35.	Line 16 x 5.75%		141,007,245
36.	Line 22 x 5%		217,973,814
37.	Line 28 x 3%		92,217,138
38.	Line 33 x 2%		111,820,758
39.	Indexed taxes payable		563,018,955
40.	Actual taxes payable		657,784,802
41.	Less: line 39		563,018,955
42.	Indexing cost		94,765,847

Note: Ratios were carried four decimal places.

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